Nomadic devices in the AIDE Project

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Nomadic devices focus within AIDE

Research Actions

•Nomadic devices use cases and derivation of requirements for AIDE

•Overview of eSafety HMI recommendations (Integration v's Installation wrt nomadic devices)

•Architecture requirements

•Design of Integration/Installation solutions

•Safety Assessment

•Integration/Installation of selected NDs in AIDE demonstrators

Supporting Actions

•AIDE European Nomadic Forum initiative (1st WS in Brussels-1/2005)

•AIDE User Forum (1st in Cologne) – Nomadic Device Session

•AIDE Architecture Forum

Growth of Nomadic devices in-vehicle use vs user needs and safety issues

2 examples expressing user needs:

→Use mobile phone for incoming & outgoing calls

- conveniently & easily
- safely & without distractions
- legally

→Use personal navigator for route guidance & map display

- same usability as for onboard navigation terminal

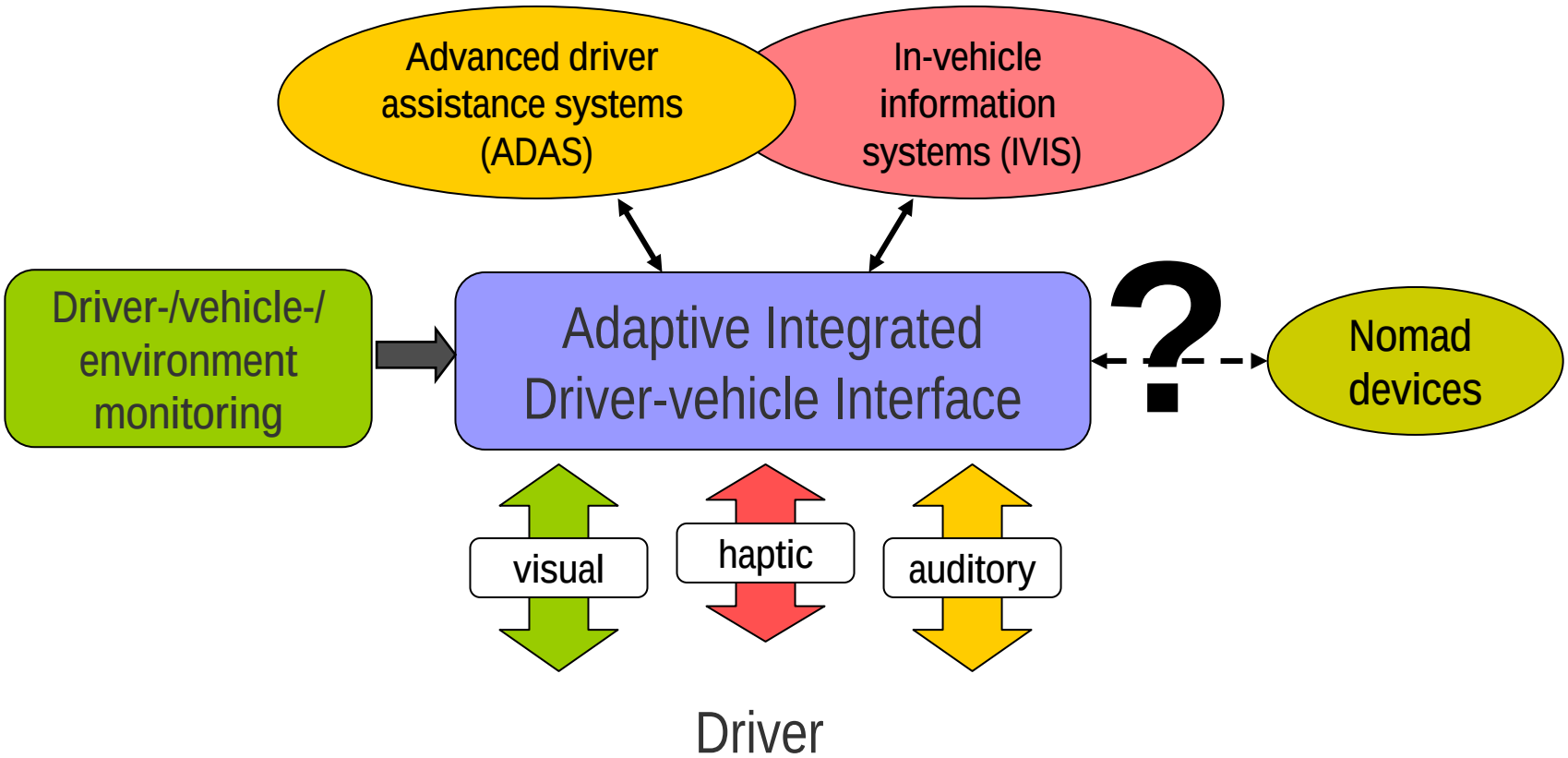
Specific points of concern include:

- **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.**

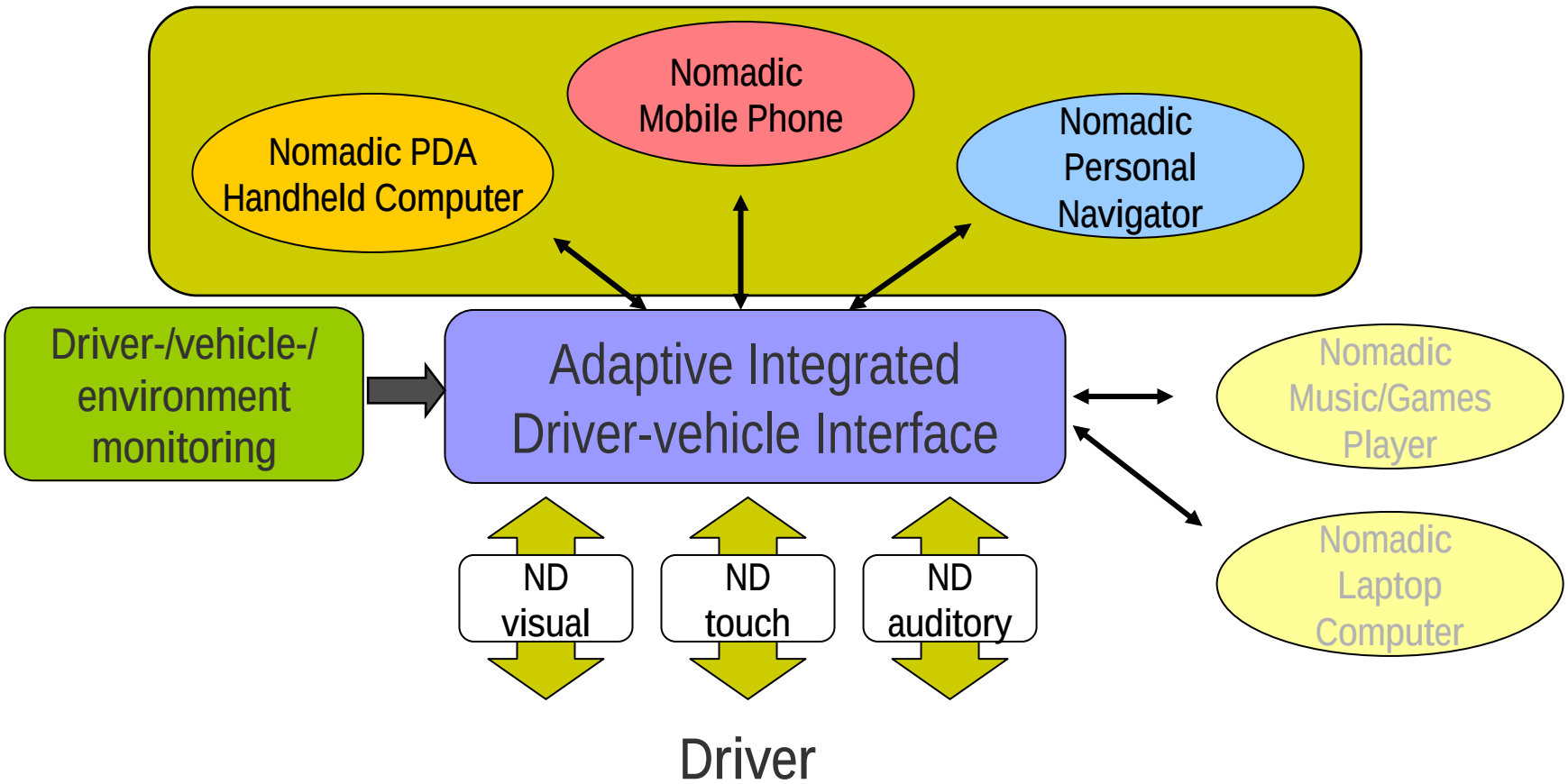
Nomadic Forum aims and objectives

- act as European consensus platform to reach cross-sector agreement on issues relating to nomadic device safety, technical harmonisation, in-vehicle integration and deployment
- define the principles for managing nomadic device-vehicle information exchange via a “Smart Vehicle-Device Interface”
- address key issues for nomadic devices, including specifications for in-vehicle docking/integration and installation, standardisation of interfaces and guidelines for nomadic device HMI and safety
- identify requirements for new work items in the appropriate standardisation bodies
- act as a bridge between the *e*Safety research projects on nomadic device issues and also between Europe and the rest of the world
- provide advice to the EC and support AIDE and other projects’ work on nomadic devices

How to integrate Nomadic Devices in AIDE solution?



Nomadic device use cases in AIDE



Work on Nomadic devices requirements for AIDE

General Nomadic devices requirements

- Devices shall be able to communicate with the AIDE system (input, output) e.g. via a wirelessly or physical connection.
- AIDE system shall provide a standard interface allowing requests from device for access to in-vehicle I/O devices
- AIDE system shall provide a standard interface allowing ICA HMI manager to filter I/O requests from device and to provide control messages to device operating system

Mobile phone /PDA/ PND requirements (full report in D.3.2.1)

Highlights from AIDE User Forum (ND)

From studies (Nokia) the 3 main areas of interest (wrt ND services in car) to the consumer were-

- Mobile Phone services
- Navigation Services
- Music (portable)

Stakeholders for first item above were identified as-

- Car Manufacturer
- Device Manufacturer
- Service Provider

Highlights from AIDE User Forum (ND)

The requirements for each stakeholder was then explored-

Car Manufacturer

- EMC
- Microphone
- Loudspeakers
- Audio Management
- User interface availability (ie what is available in the car)
- Physical location
- Data interface
- Voice Interface
- Antenna Interface
- Controls
- Voice control
- Power (especially an issue if BT is to be used)
- Screen

Highlights from AIDE User Forum (ND)

ND Services identified-

- Phone
- Navigation
- Information
- PIM
- Music
  - Digital Rights Management (DRM) is an issue (if moving/copying to vehicle)
  - Portable Storage
- Fleet Management Services

Highlights from AIDE User Forum (ND)

Phone Manufacturer

- Data interface (inc. ICA info)
- Voice interface
- Control state of phone call (eg via ICA)
- Manipulate state of VM
- Services availability

Telecom Provider

- (most of phone manufacturer list – as this will depend on implementation of phone/provider)
- Sim Management (eg how to manage multiple sims, handover when in car)
- Network Services.

Highlights from AIDE User Forum (ND)

Some issues/points were raised but not explored in detail-

•What about the situation of when mobile phone is handed over to a passenger – the ICA type filtering should not be applied – so how would this be managed?

•What about multiple mobile phones (eg from different members of a family that all could be the driver)

•What about possibility of using ND as another input sensor for the car eg using the mobile phone camera to detect road signs? (it was pointed out that currently the technology for this was not adequate for this purpose)

Nomad devices integration within AIDE- T3.4.4 Task Overview

- Using inputs from previous tasks and activities (e.g. Use cases, system architecture, nomad forum) the following tasks shall be carried out-
  - Analysis of the communication capabilities of the existing nomad devices
  - Selection of nomad devices/services for demonstration
  - Validation / update of architecture to support ND integration/installation
  - Specification of the communication and other interfaces of the vehicle to the devices – The “Nomadic Gateway” covering-
    - Physical – what (if any) physical mount will be required and how it could be “standardised”
    - Electrical – what if any electrical connections required (for comms, recharging)
    - Communication – e.g. bluetooth, wifi, MOST interface.
    - Comms protocol – e.g. AMI-C, bluetooth profile
    - Remote nomad application control (e.g. “PC-Anywhere”…)

T3.4.4 Task Overview (cont)

- Functional and technical requirements covering-
  - Definition of the “essential tools” to be enabled in a “workload free” mode (e.g. SMS, phone calls, agenda inputs)
  - Interaction requirements (derived from use cases)
  - Interface requirements to AIDE components (e.g. DVE, ICA)
- Design and implementation of the interfacing interaction to enable to pilot/filter the use of the devices in the demonstrators.

- Guidelines for safe Integration of NOMAD devices within the vehicle environment

Dependencies /Interactions with other Tasks within AIDE

T3.1.2 : Use cases

T3.1.1 : Nomad forum recommendations (to be produced over next 1-2 years)

•T3.2.3 : System Architecture

•T3.3 : DVE/Nomad interface (gateway) interaction ? (dependant on system architecture)

•T3.4.1 : HMI design? (dependant on system architecture)

•T3.4.3 : I/O device interaction? (dependant on system architecture)

•T3.4.5 : ICA interface interaction

•Devices

•Demonstrator(s)

Nomad Devices : Integration v's Installation

HMI aspects of Integration vs. Installation?

- **Integration –** OEM (High end vehicles)
  - Uses vehicle I/O devices
  - Adaptive HMI by in vehicle ICA / DVE
  - Vehicle I/Os to follow / keep up with Nomad I/O capability – restricted number of applications
- **Installation -** SyM (all other vehicles)
  - Uses Nomad I/Os
  - ICA interface to vehicle (standard commands?) or
  - ICA in Nomad, DVE interface ? Or
  - . . . ?
- **Both?**
  - Disable functions (ESoP = "filtering")
  - Adaptive HMI (AIDE)

Nomadic devices access within AIDE: Study on eSafety proposal for enhanced ESoP on HMI

According to eSafety proposal for enhanced ESoP on HMI the we have to distinguish between :

- Nomad Device full **integration** into the car's HMI and
- Nomad Device **installation** with "filter" function through the car

→ In the first case (i.e. integration) the input/output of the ND can be via the car's HMI, with the second case (i.e. installation) the input/output shall be via the ND itself.

Nomadic devices access within AIDE: Recommendations from the eSafety-HMI working group

3 main areas of interest with respect of Nomad Devices (NDs)–

a) Assigned responsibilities (System Manufacturers (SyM), Service Providers (SP), Member States (MS), …) are defined

b) Installation

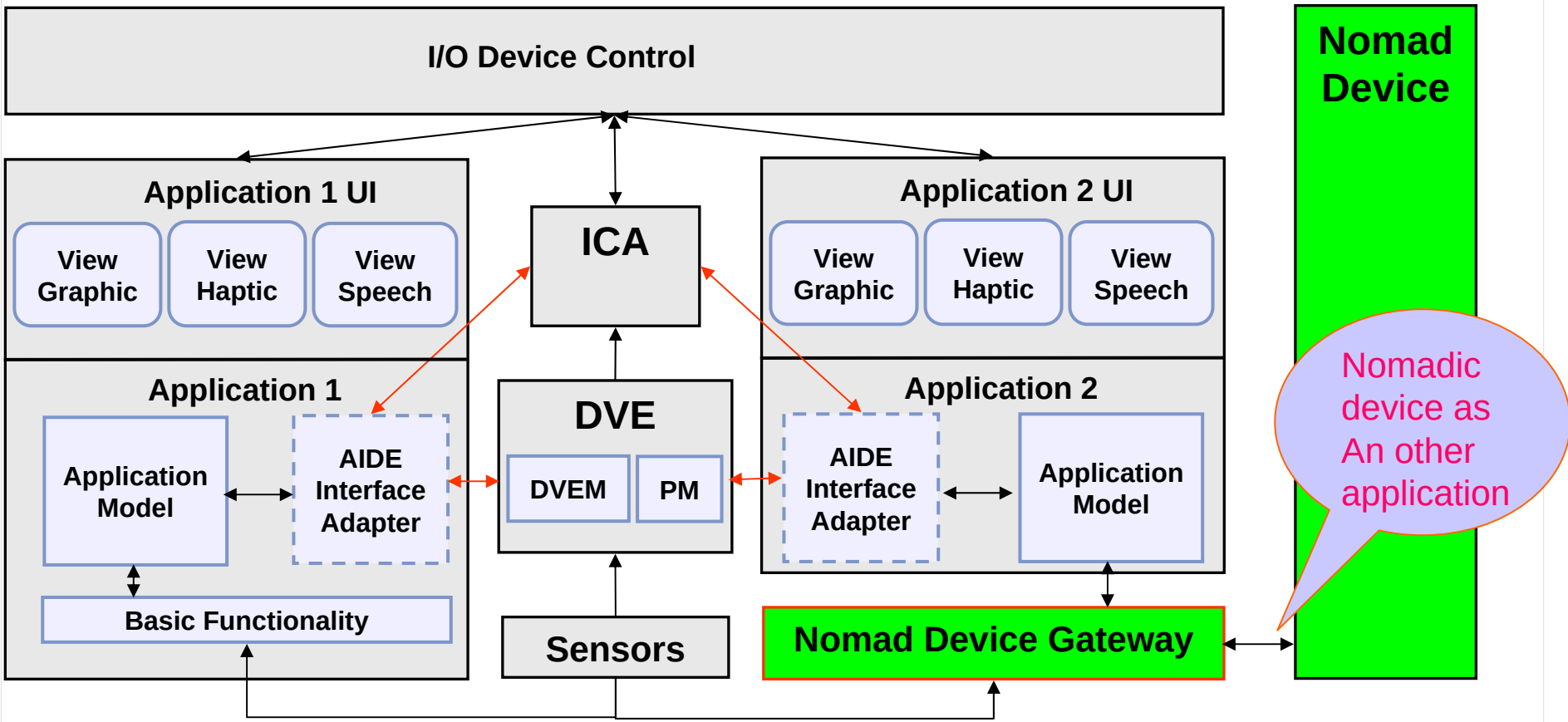
of the ND by using the installation kit provided by the System Manufacturer (SyM). HMI I/Os remain with the ND. (R-SyM-2)

c) Integration

fully into the vehicle HMI including I/Os. (R-SyM-4)

- ***In b) that would mean, that the ICA should control (the doc says "filter") the HMI with respect to DVE conditions. The ND interface then has to provide ICA commands for the ND. This is AIDE improvement to R-SyM-3. It could be demonstrated e.g. by integration of MOT installation kit in our test vehicle.***

AIDE logical view of the component structure (current architecture proposal)



Next development steps within AIDE SP3

(AIDE demonstrators- focus)

- Ideally ensure that architecture design can support both integration and installation (i.e. high end and low end cars)
- Select ND types (or services) that will be used for the demonstration
- Integration or installation selection?
- Define interfaces required for the Nomadic Device Gateway (covering communication, protocols, electrical, physical) for these devices and integration/installation option.

European Nomadic Forum – Expectations/ Next Steps

- …….
- ……..
- ……..
- …….