



## Nano Scale Disruptive Silicon-Plasmonic Platform for Chip-to-Chip Interconnection

### Project Reference Online Manual

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#### List of Partners concerned

Partner number	Partner name	Partner short name	Country	Date enter project	Date exit project
1	Karlsruher Institut für Technologie	KIT	Germany	M1	M36
2	INTERUNIVERSITAIR MICRO-ELECTRONICA CENTRUM VZW	IMCV	Belgium	M1	M36
3	TECHNISCHE UNIVERSITEIT EINDHOVEN	TU/e	Netherlands	M1	M36
4	RESEARCH AND EDUCATION LABORATORY IN INFORMATION TECHNOLOGIES	AIT	Greece	M1	M36
5	UNIVERSITAT DE VALENCIA	UVEG	Spain	M1	M36
6	STMICROELECTRONICS SRL	ST	Italy	M1	M36
7	UNIVERSITEIT GENT	UGent	Belgium	M1	M36

<sup>1</sup>  
**PU** = Public  
**PP** = Restricted to other programme participants (including the Commission Services)  
**RE** = Restricted to a group specified by the consortium (including the Commission Services)  
**CO** = Confidential, only for members of the consortium (including the Commission Services)

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### *Executive Summary*

This document shall incorporate (all) rules procedures concerning the technical and administrative management of the project and is therefore to be updated on a regular basis. Please look at [www.navalchi.eu](http://www.navalchi.eu) regularly for the latest version.

### *Change Records*

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## Introduction

To successfully run and complete an EC funded project in the FP7, a multitude of rules and regulations have to be kept in mind, as already the list of references (EC-GA, DoW, CA, EC financial guide) of this document illustrates. Hence this deliverable is supposed to present the knowledge which is essential for the day-to-day business of NAVOLCHI in a more condensed form, while providing references for further enquiries.

In case some issues have not been addressed this document will be extended. The information and advice contained herein is not intended to be complete or comprehensive and readers are advised to seek independent professional advice before acting upon them. The authors do not accept responsibility for the consequences of errors or omissions herein enclosed, nor do the authors accept responsibility in connection with the use or re-use made of the information contained in this manual.

## Project Details

### *Objectives*

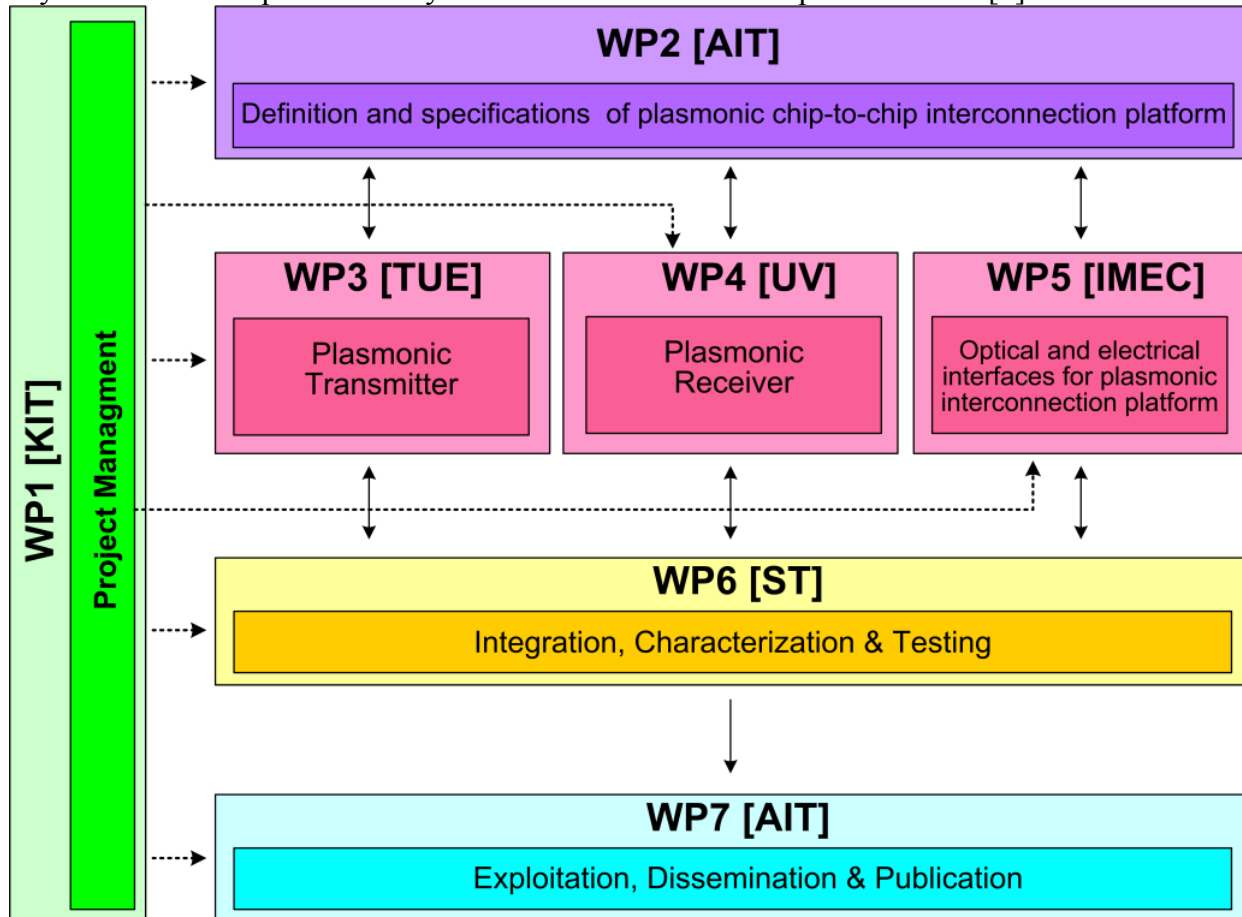
The NAVOLCHI project's duration is from November 1, 2011 until October 31, 2014.

The project explores, develops and demonstrates a novel nano-scale plasmonic chip-to-chip and system-in-package interconnection platform to overcome the bandwidth, foot-print and power consumption limitations of today's electrical and optical interconnect solutions. The technology exploits the ultra-compact dimensions and fast electronic interaction times offered by surface plasmon polaritons to build plasmonic transceivers with a few square-micron footprints and speeds only limited by the RC constants. Key elements developed in this project are monolithically integrated plasmonic lasers, modulators, amplifiers and detectors on a CMOS platform. The transceivers will be interconnected by free space and fiber connect schemes. The plasmonic transceiver concept aims at overcoming the challenges posed by the need for massive parallel interchip communications. Yet, it is more fundamental as the availability of cheap miniaturized transmitters and detectors on a single chip will enable new applications in sensing, biomedical testing and many other fields where masses of lasers and detectors are needed to e.g. analyze samples. Economically, the suggested technology is a viable approach for a massive monolithic integration of optoelectronic functions on Si substrates as it relies to the most part on the standardized processes offered by the silicon industry. In addition, the design and production cost of plasmonic devices are extremely low and with the dimension 100 times smaller over conventional devices they will require much lower energy to transfer data over short ranges of multi-processor cluster systems. The project is disruptive and challenging but it is clearly within the area of expertise of the consortium. It actually builds on the partners' prior art such as demonstration of the first nano-scale plasmonic pillar laser. This project has the potential to create novel high-impact technologies by taking advantage of the manifold possibilities offered by plasmonic effects.

Reporting in the NAVOLCHI project will be work package based, meaning that in case of interpretation differences between the objectives formulated above and the task-wise definition the latter one is given precedence.
---

## Work packages

To bundle all tasks into categories for easier management, the project is divided into 7 work packages (WPs). Their interrelation is depicted in the following figure, which includes a short keyword like description of every WP. For more information please refer to [2].



**Figure 1:** Shows the organization of the NAVOLCHI project into the 7 respective work packages

The work packages are summarized<sup>2</sup> below:

### WP1

#### Project Management

Two main tasks are covered with this work package: First, it is devoted to organization, securing and managing resource of the consortium to bring about the successful competition of goals and objectives covered by NAVOCLHI.

- Strategic management at project level.
- Control of work package activities, including technical quality control.
- Organisation of project reporting and meetings.
- Control of deliverable preparation.
- Conflict management.

<sup>2</sup> For a detailed description including the definition of the respective tasks see [2] in section B.1.3.3.

The second part is dedicated to the assessment of the quality of the work and the deliverables produced in the project. The objectives of this task are to ensure adequate quality of the outcomes of the project:

- Quality of the produced deliverables.
- Quality of the internal deliveries.

## **WP2**

### **Definition and specifications of plasmonic chip-to-chip interconnection platform:**

This work package will investigate the new plasmonic device technology for chip-to-chip interconnection. An important activity is the development of a cycle accurate VHDL functional model of the plasmonic interconnects for cosimulation with the digital part VHDL and FE netlist. During this phase the development of a cycle accurate functional model of the serializer and the deserializer representing the link between the on-chip electronics digital part and the plasmonic interconnect will be required as well. In particular, the main objectives are:

- To identify advanced interconnections functionalities targeted to chip-to-chip communication for the developed plasmonic integrated photonic components.
- To define optical interconnection system environment and parameters within which the plasmonic devices have to function and that will be used for evaluating its performance with respect to processor to processor communication in data centres.
- To investigate the optical interconnect system level specifications that should be met for each of the respective potential chip-to-chip communications. To develop a cycle accurate VHDL
- model of plasmonic interconnect.
- To develop a cycle accurate VHDL model of serializer/deserializer.
- To evaluate the efficiency of the proposed solutions in terms of cost and green aspects with respect to the existing technology solutions.

## **WP3**

### **Plasmonic Transmitter:**

This work package will investigate via simulation various parameters and strategies for the plasmonic transmitter component of the project. This component consists primarily of a plasmonic laser and a plasmonic modulator, both connected to SOI Si waveguides. After simulation studies the plasmonic laser and modulator will be fabricated and delivered to other work packages. In particular the main objectives are:

- Simulation studies to optimize laser size and structure to obtain maximum output power into
- either a plasmonic or conventional SOI waveguide.
- Electrically pumped plasmonic/metallic nano-laser devices bonded onto an SOI wafer with light coupled into either a plasmonic or conventional SOI waveguide.
- Performance targets for the laser are an active region area less than approximately one square
- micron, and optical output power coupled into the waveguide of at least approximately 100
- microwatts with an attempt to achieve output powers up to one milliwatt.
- For the modulator, more than 10dB extinction ratio in the device length shorter than 10  $\mu\text{m}$  will be demonstrated.
- Modulation speeds up to 40Gbit/s and higher will be demonstrated.

## **WP4**

### **Plasmonic Receiver:**

The main objective is the development of Receiver technology through:

- Appropriate designs and modelling (Tasks 4.1 and 4.2).
- Development of plasmonic optical amplifier based on IV-VI colloidal nanocrystals (Tasks 4.3-4.4).
  - Optimum QDs and structures based on them to furnish maximum gain (Tasks 4.3).
  - Concepts developed to obtain gain from QDs by using optical injection (Tasks 4.4).
  - Gain from QDs by using electrical injection (Tasks 4.4).
- Development of Plasmonic photodetectors (Tasks 4.5).
  - Simple concept of QDs in metallic nano-gap photoconductors.
  - Photodetectors based on Plasmonic Patternable Conductive Polymers (PPCP).

### **WP5**

#### **Optical and electrical interfaces for plasmonic interconnection platform:**

Next to the advanced active plasmonic devices being developed in WP3 and WP4 we need several supporting passive components, such as silicon to plasmonic waveguide couplers, chip-to-chip couplers and optical noise filters. All of these are designed and fabricated in WP5. Moreover a Hardware (HW) module acting as interface between different chips (dice) is required; such a module is called Dual Die Communication Module (DDCM) and is also specified and designed within WP5. Such a module will support natively IP protocols from STMicroelectronics, i.e. STBus, VSTNoC and Spidergon STNoC.

In particular the objectives are:

- To design and simulate the couplers needed to efficiently couple light from the silicon backbone network to the highly confined plasmonic waveguide structures used for the laser, modulator and amplifier.
- To design and simulate optically beam shaping gratings to direct light between chips separated by 1 mm.
- To design and simulate compact filters to suppress noise originating from the optical preamplifier.
- To fabricate these devices.
- To specify, design and verify the Dual Die Communication Module.
- To implement the DDCM as a hardware module exploiting FPGA technology.

### **WP6**

#### **Integration, characterization and testing:**

The objective of this WP is:

- The characterization and testing of the particular active and passive plasmonic devices.
- Its integration with the plasmonic interconnect modules, representing the physical layer (PHY) of such a communication structure and.
- The System in Package characterization and testing.

### **WP7**

#### **Exploitation and Dissemination:**

This Work package deals with the exploitation and dissemination of the developed optical interconnection platform, as well as the contribution to standardization bodies and promotion of the project to students and researchers within the scientific community and the general public.

The objectives of this work package are listed below:



- Identification of potential groups of users of the developed plasmonic devices technologies and establishing the chip-to-chip interconnection interface.
- Generation of intellectual property (patents portfolio) to set the basis for potential commercialization of products relevant to the project results.
- Promotion of the project outputs through the participation in optical conferences and symposiums. Preparation and distribution of technical brochures.
- Dissemination of project results through publications in scientific journals and magazines, presentations in international conferences and workshops as well as through lecture presentations in academia and industry. Industrial partners should be present at related industrial meetings to promote the technology transfer.
- Monitor roadmaps and standards.
- Coordinate Activities towards possible contributions to standardization bodies (e.g. IEEE, ITU/FSAN).
- Interaction with other EU and National projects.
- Provide input to industrial partners based on scenarios of the proposed solutions.
- Maintenance of the project web site which will be used for information and result dissemination purposes. Public project reports will be made available there. The web site will have a specific section in the webpage dedicated to innovation and technology transfer and will provide means to allow for discussion and the possibility for others to submit information.
- Compile a regularly updated database of contacts that can be interested in the specific area including also a network of journalists/editors that can be interested in promoting the results of the project in their respecting newspapers/magazines.

## Budget

The objectives are to be realized with the funding budget<sup>3</sup>, which covers only part of the total costs, as shown in the next figure:

Participant number in this project <sup>11</sup>	Participant short name	Fund. % <sup>12</sup>	Ind. costs <sup>13</sup>	Estimated eligible costs (whole duration of the project)					Requested EU contribution
				RTD / Innovation (A)	Demonstration (B)	Management (C)	Other (D)	Total A+B+C+D	
1	KIT	75.0	T	484,074.00	0.00	132,560.00	0.00	616,634.00	495,615.00
2	IMCV	75.0	A	508,818.00	0.00	4,400.00	0.00	513,218.00	386,013.00
3	TU/e	75.0	A	462,120.00	0.00	15,634.00	0.00	477,754.00	362,224.00
4	AIT	75.0	A	386,251.00	0.00	15,300.00	0.00	401,551.00	304,988.00
5	UVEG	75.0	T	395,760.00	0.00	14,720.00	0.00	410,480.00	311,540.00
6	ST	50.0	A	781,880.00	0.00	21,360.00	0.00	803,240.00	411,700.00
7	Ugent	75.0	T	170,560.00	0.00	0.00	0.00	170,560.00	127,920.00
Total				3,189,463.00	0.00	203,974.00	0.00	3,393,437.00	2,400,000.00

Note that the budget mentioned in this table is the total budget requested by the Beneficiary and associated Third Parties.

### EC Payment scheme: From the EC to the Coordinator, Article 6 of Grant Agreement:

- max. contribution 2.400.000€
- pre-financing 1.560.000€
- until final report, 5% (guarantee fund) final payment are withheld by the EC: 120.000€
- payment schedule:
  - pre-financing (after subtracting guarantee fund contribution): 1.440.000€
  - final payment + guarantee fund contribution (after more than 3a): 960.000€

<sup>3</sup> This table is taken from [2], version 1.0 and therefore dates from the same time.

### **Distribution scheme: From the Coordinator to the Partners**

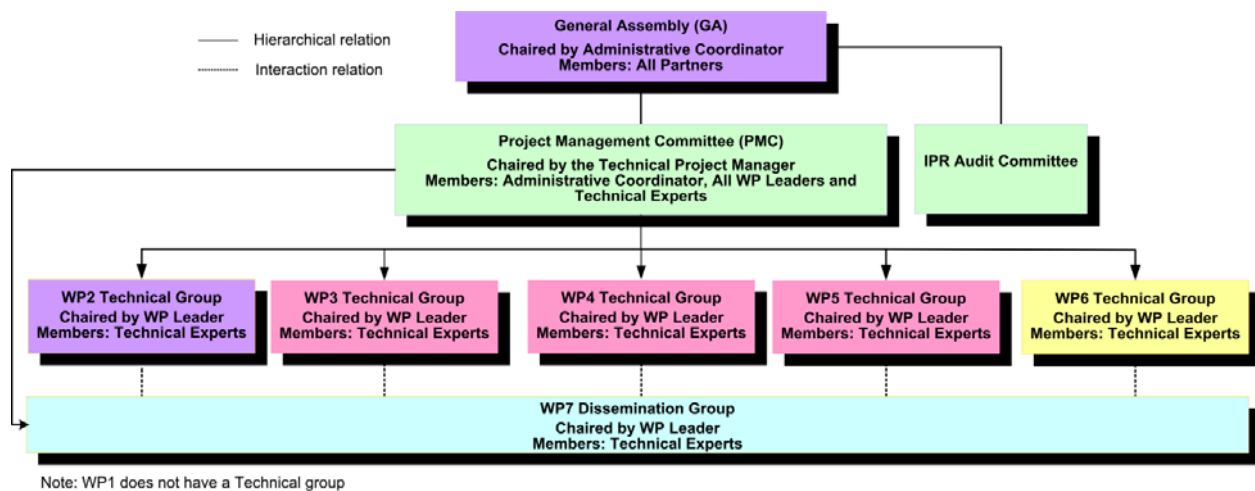
- Payments to Parties are the exclusive tasks of the Coordinator.
  - Coordinator notifies the Party concerned promptly of the date and composition of the amount transferred to its bank account, giving the relevant references.
- The payment schedule, which contains the transfer of pre-financing and interim payments to Parties, will be handled according to the following:
  - Budgeted costs for future work included in the Consortium Plan will be paid to Parties in separate instalments minus the share withheld by the EC (guarantee fund, final payment) every 6 months for the following 6 months, except for the first 12 months, which will be paid upon signature of the Consortium Agreement.
  - Costs accepted by the Commission will be paid to the Party concerned, taking into account the amounts already paid for such reporting period.
- The Coordinator is entitled to withhold any payments due to a Party identified by a responsible Consortium Body to be in breach of its obligations under the Consortium Agreement or the EC-GA.
- The Coordinator is entitled to recover any payments already paid to a Defaulting Party.

### **Governance Structure**

To allow for efficient project management, insight into the governance structure of the NAVOLCHI project is indispensable. Thus this section presents how various Consortium bodies interact in the day-to-day work. For further regulations see [3].

- **General Assembly** as the ultimate decision-making body of the Consortium
- **Executive Board** called **Project Management Committee**, as the supervisory body for the execution of the Project which shall report to and be accountable to the General Assembly.
- **Sub Project Committees** called **Work Package Technical Groups**, as management groups for Sub Projects, i.e. respectively the Work Packages 2 to 6. *This is where the work is done.*
- The **Coordinator** is the legal entity acting as the intermediary between the Parties and the European Commission. The Coordinator shall, in addition to its responsibilities as a Party, perform the tasks assigned to it as described in the EC-GA and the Consortium Agreement.
- The **Technical Project Manager** assists the Executive Board and the Coordinator.
- **IPR Audit Committee (IAC)** is only assembled upon need.

The following figure explains their interrelation:



**Figure 2: Governance structure of the NAVOLCHI Consortium.**

### Decision Making – Voting

Voting occurs in General Assembly. All other consortium bodies decide either by consensus (quorum) or have to forward the respective issue to the next, higher instance.

Decisions in the General Assembly shall be taken by a simple majority ( $\geq 1/2$ ) of the votes. In case of a standoff the Coordinator can decide. If only 4 partners are present or represented, then 75% majority of these people is needed to take decisions.

In general: No valid decision unless two-thirds ( $2/3$ ) of Members are present or represented (quorum: 5 out of 7 parties need to be represented).

### GA – General Assembly

The General Assembly consists of one representative of each Party. The following decisions shall be taken by the General Assembly:

- Content, finances and intellectual property rights, e.g.
- Changes to Annex I of the EC-GA (to be agreed by the European Commission)
- Changes to the Consortium Plan (including the Consortium Budget)
- Changes to Attachment 1 (Background included), Additions to Attachment 2 (Background excluded), Attachment 4 (Listed Affiliated Entities), Attachment 6 (List of Third Parties)
- Evolution of the Consortium (e.g. new Parties, Defaulting Parties)
- Decision on issues forwarded by the Executive Board (PMC)
- On the basis of Annex I, the appointment if necessary of
- Sub Project Leaders
- Executive Board (PMC) Members

### PMC – Project Management Committee

The PMC, also called Executive Board shall consist of

- the Coordinator,
- the Technical Project Manager and
- all of the Sub Project Leaders (work package leaders) as appointed by the General Assembly, while the Sub Project Leader of Work Package 6 is only to be part when Work Package 6 is affected.

- Additional Technical Experts can join upon need, but may not vote.

The PMC shall collect information at least every 6 months on the progress of the Project, examine that information to assess the compliance of the Project with the Consortium Plan and, if necessary, propose modifications of the Consortium Plan to the General Assembly.

The PMC is responsible for:

- Coordination, monitoring and control of the progress of the work in the project,
- Launch or stop of Work-packages,
- Technical Management of the project,
- Analyses and solutions on technical issues,
- Technological roadmaps,
- Approval of the deliverables,
- Launch selection of sub-contractors,
- Preparation of dissemination and communication with the support of WP 6,
- Management of foreground and IPR,
- Publications and press releases.

#### **The Coordinator (J. Leuthold) and Technical Project Manager (NN)**

Given the size of the Consortium, some tasks of the technical project manager might be carried out by the coordinator, or at least strongly supported. Also, the technical project manager is involved in presenting the project to external parties (e.g. at the review of the project).

J. Leuthold, the Coordinator organizes the activities of all partners in the project according to work plan, and provides the Commission with technical, managerial and financial information. He will act as the unique focal point for contacts and coordination with the European Commission, with other relevant ICT projects, and external relationship with relevant bodies and other related activities. More particularly he is in charge of representing the GA reporting to the commission and interfacing the EC Project Officer, and reporting to GA about all administrative issues emerged by the EC Project Officer.

Major tasks are:

- Supervision of the overall project progress,
- Consortium Agreement coordination,
- Collection of the audit certificates and supervision of distribution of EC's payments to partners,
- Preparation with the support of the Project Management Committee of the reports, cost statements and project documents required by the EC,
- Organisation of EC review meetings,
- Supervision of IPR and knowledge management (with relevant advice of IPR Audit Committee),
- Representative of the consortium to events,
- Coordination of the dissemination and communication activities,

NN, the Technical Project Manager, organizes the following points:

- Chair of the Project Management Committee,
- Liaisons between the Project Management Committee and the General Assembly;
- Technical relationship and coordination with other relevant R&D projects,
- Supervision of the overall technical progress of the project;
- Consolidation of the technical reports;
- Preparation of minutes of the General Assembly, and follow-up of its decisions;
- Follow-up and coordination of all technical work-packages;
- Transmission of any documents and information connected with the project between the partners.

### Work Package Leaders

A work package leader (Sub Project Leader) shall chair all meetings of a WP committee.

The WP Leader shall have the following functions only:

- communicating any plans, deliverables, documents and information connected with the WP between its members and, if relevant, to the PMC
- submitting the implementation plan of the WP to the PMC for review and proposing an update of the Consortium Plan.
- coordinating on a day-to-day basis the progress of the technical work in the WP
- following up decisions made by Consortium Bodies insofar as they affect the WP
- advising the Coordinator of any discrepancy with the Consortium Plan, including any delay in delivery and deviation from the assigned budget.

WP leaders:

- WP1 is led by PD Dr. Manfred Kohl (KIT)
- WP2 is led by Prof. Emmanouil-Panagiotis Fitrakis (AIT)
- WP3 is led by Prof. Meint Smit (TU/e)
- WP4 is led by Prof. Juan Martinez Pastor (UVEG)
- WP5 is led by Prof. Dries van Thourhout (IMEC)
- WP6 is led by Dr. Alberto Scandurra (ST)
- WP7 is led by Prof. Dimitrios Klonidis (AIT)

Each WP committee shall manage the respective work package, in particular with regard to:

- the timely delivery of reports and results to the PMC and the Coordinator
- reviewing the quality of the reports
- formulating an implementation plan for the activities within the WP for the future period, which can imply proposing to the PMC changes to the Consortium Plan and/or Annex I of the EC-GA
- making proposals to the PMC for the admission of new Parties to the EC-GA and to the Consortium Agreement in order for said new Parties to participate in the WP
- alerting the PMC and the Coordinator in case of delay in the performance of the WP or in case of breach of responsibilities of any Party under said Sub Project
- deciding upon any exchange of tasks and related budgets between the Parties in a WP when such exchange has no impact beyond the scope of the WP and its budget.

### Meetings

Monthly conference calls take place after prior agreement. Time is always given in CEST.

WP Committees are encouraged to discuss technical details the day before or after this call.  
See conference call details in the Communications section of this document

GA meets at least once a year  
PMC meets at least every 4 months, with a conference call every 2 months  
WP Committee meets at least every 2 months (in practice upon need)

Notices for meetings (extraordinary meetings, see [3])

GA 30 calendar days  
PMC 14 calendar days  
WP Committee 7 calendar days

Sending the agenda (extraordinary meetings, see [3])

GA 21 calendar days  
PMC 7 calendar days

WP Committee 7 calendar days

### ***Consortium Agreement - Things to Know***

This section of the manual is only pointing out some issues which seem more relevant to the day-to-day work in the Consortium and is presented in keywords only. For the exact formulations the reader has to refer to the original documents.

Hierarchy of documents:

1. EC Grant Agreement (incl. its annexes)
  - a. Core Contract
  - b. Annex I (Description of Work, DoW)
2. Consortium Agreement (CA)

### **Intellectual Property Rights (IPR)**

Foreground in short: Intellectual Property (IP) generated in the project.

Background in short: IP of partners before the project.

The NAVOLCHI project adopted the ‘Background excluded list’ option (black list approach) of the DESCA template, however:

Foreground and Background shall be used only for the purposes for which Access Rights to it have been granted.

All requests for Access Rights shall be made in writing.

### **Publications**

All publications resulting from the NAVOLCHI project have to contain the following line: “The research leading to these results has received funding from the European Community’s Seventh Framework Programme (FP7-ICT-2011-7) under grant agreement no. 288869”

### **Standard Procedure**

Prior notice of any planned publication shall be made 20 days before the publication.

Any objection to the planned publication shall be made in accordance with the GA in writing to the Coordinator and to any Party concerned within 15 days after receipt of the notice.

If no objection is made within the time limit stated above, the publication is permitted.

### **Objections according to [3] CA 8.3**

Handling objections is according to CA 8.3.1.2, 8.3.1.3.

Objections have to include a proposal for the resolution of the conflict!

### Material and Sample Transfers

In general: Samples (deliverables) are property of the provider.  
Joint ownership needs special regulation. Why, when does this situation arise?

Example:

Design of the waveguides, structures (IMEC, ST)  
+ structuring of the wafer (KIT)  
+ nonlinear cladding (NN)  
+ packaging (NN)

---

Who owns the samples? → Joint ownership!

It is therefore *mandatory* (in case of joint ownership) to

- keep records on every piece
- keep broken samples
- samples shall not be lost or destroyed (even when irreversibly damaged) without consultation of the (other) owner(s).

Use the template provided on the NAVOLCHI website, which is to be send along with the samples in order to trace the processing of the samples.

If in the course of the Project an irrevocable combination of materials or samples (in the following called Samples) is created then the providing Parties become joint owners.

1. The Samples are to be distributed as foreseen in Annex I of the EC-GA to fulfil the Project objectives.
2. If the Samples are of no further use to the Project, the joint owners can:
  - a. Agree unanimously to distribute them amongst themselves in shares.
  - b. In case of dispute joint owners can either
    - i. call for the General Assembly to decide or
    - ii. verifiably destroy the Samples.

### ***Human Resources and Deliverables***

Revisions in assigned person months can be proposed by the PMC to become part of the Work Plan and to initiate an adaption of the Description of Work [2] with the consent of the EC. Small updates are to be included only in the Work Plan.

**Assigned Manpower**

**Table 1 Project effort form – indicative efforts per activity type per beneficiary**

Activity type	Part. 1 KIT	Part. 2 IMCV	Part. 3 TU/e	Part. 4 AIT	Part. 5 UVEG	Part. 6 ST	Part. 7 Ugent	Total
<b>1. RTD/Innovation activities</b>								
WP 2	2.00	1.00	6.00	18.00	2.00	12.00	0.00	41.00
WP 3	26.00	3.00	29.00	0.00	0.00	1.00	0.00	59.00
WP 4	3.00	11.00	0.00	9.00	32.00	1.00	24.00	80.00
WP 5	12.00	14.00	0.00	0.00	4.00	30.00	0.00	60.00
WP 6	4.00	3.00	3.00	10.00	2.00	22.00	0.00	44.00
WP 7	3.00	1.00	1.00	8.00	1.00	10.00	0.00	24.00
Total Research	50.00	33.00	39.00	45.00	41.00	76.00	24.00	308.00
<b>2. Demonstration activities</b>								
Total Demo	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>3. Consortium Management activities</b>								
WP 1	16.00	1.00	1.00	2.00	2.00	2.00	0.00	24.00
Total Management	16.00	1.00	1.00	2.00	2.00	2.00	0.00	24.00
<b>4. Other activities</b>								
Total other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>66.00</b>	<b>34.00</b>	<b>40.00</b>	<b>47.00</b>	<b>43.00</b>	<b>78.00</b>	<b>24.00</b>	<b>332.00</b>



### ***Deliverables***

In the Description of Work [2], person months (PMs) have been assigned to the deliverables. As these are going to be realized within the respective tasks, the exact number of PMs is subject to some uncertainty, because there was no clear definition given, if e.g. the effort for a deliverable in form of a report includes only the time of writing<sup>4</sup> the actual document, or whether devising and realizing an experiment to find the result to write a report about should be included into the calculation as well.

A summary of all deliverables can be found in the following table, whereas a sorted list (including milestones and all tasks as well) can be found in the annex to this document.

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<sup>4</sup> and interpretation / collection of measurement data

**Table 2 Deliverables List**

Deliverable Number <sup>61</sup>	Deliverable Title	WP number <sup>63</sup>	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D1.1	Project web site with .eu domain (M 01) and continuous update	1	1	4.00	O	PU	1
D1.2	Project reference online manual.	1	1	2.00	O	RE	3
D1.3	Project quality online assurance manual:	1	1	2.00	O	RE	6
D1.4	Intermediate Progress Report	1	1	2.00	R	PU	9
D1.5	Intermediate Progress Report	1	1	2.00	R	RE	27
D2.1	Definition of chip-to-chip interconnection system environment and specification	2	6	7.00	R	RE	3
D2.2	Definition of plasmonic devices	2	4	7.00	R	RE	12
D2.3	Investigation of chip-to-chip interconnection-level specifications employing new plasmonic devices	2	4	6.75	R	RE	24
D2.4	Interface and plasmonic interconnect models and reports	2	6	4.00	R	RE	24
D2.5	Techno-economical evaluation with respect to the cost efficiency and green aspects	2	4	14.25	R	PU	30

Deliverable Number <sup>e1</sup>	Deliverable Title	WP number <sup>e3</sup>	Lead beneficiary number	Estimated indicative person-months	Nature <sup>e2</sup>	Dissemination level <sup>e3</sup>	Delivery date <sup>e4</sup>
D2.6	Report on new applications and their opportunities	2	4	2.00	R	PU	36
D3.1	Report on studies of optimized structure for metallic/ plasmonic nano-laser and its coupling to Si WG	3	3	6.25	R	CO	12
D3.2	Report on modelling of the modulator structure	3	1	6.25	R	CO	12
D3.3	Fabrication of plasmonic laser device	3	3	25.25	R	CO	24
D3.4	Report on fabrication of modulators	3	1	21.25	R	CO	24
D4.1	Designs of plasmonic amplifiers	4	4	11.20	R	CO	18
D4.2	Report on optical properties of QDs layers and polymer nanocomposites	4	4	27.20	R	PU	18
D4.3	Designs of plasmonic photodetectors	4	4	8.20	R	CO	24
D4.4	Report on SPP amplifiers by using QDs	4	2	14.20	R	PU	30
D4.5	Report on Plasmonic photodetectors	4	5	19.20	R	PU	33
D5.1	DDCM specification document	5	6	10.00	R	CO	6
D5.2	DDCM with electrical PHY design and	5	6	10.00	R	CO	12

Deliverable Number <sup>61</sup>	Deliverable Title	WP number <sup>63</sup>	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
	verification data base						
D5.3	Compact optical filters (2nm bandwidth, >30nm FSR) and first generation beam shapers	5	2	9.00	R	CO	21
D5.4	Generic DDCM compatible with plasmonic-based PHY specification document	5	6	9.00	R	PU	24
D5.5	Report on plasmonic waveguide couplers	5	2	14.00	R	CO	24
D5.6	Generic DDCM compatible with plasmonic-based PHY design and verification data base	5	6	3.00	R	CO	30
D5.7	Second generation beam shapers (distance 1mm, with bandwidth > 10nm and efficiency > 3dB)	5	2	5.00	P	CO	33
D6.1	Report on characterization results of all plasmonic devices	6	3	10.00	R	RE	27
D6.2	Report on characterization results of all optical interface plasmonic passive components	6	1	4.00	R	RE	27
D6.3	Report on chip to chip interconnect characterization	6	6	20.00	R	PU	36

Deliverable Number <sup>61</sup>	Deliverable Title	WP number <sup>63</sup>	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D6.4	Report on plasmonic chip-to-chip interconnect prototype testing and evaluation	6	4	10.00	R	PU	36
D7.1	First report on NAVOLCHI dissemination and promotion activities	7	6	2.00	R	RE	18
D7.2	First report on NAVOLCHI exploitation activities	7	4	2.00	R	RE	18
D7.3	Mirror Deliverable of D7.1, which will be available to the public on the website.	7	3	4.00	R	PU	18
D7.4	Intermediate report on recent achievements.	7	4	2.00	R	PU	18
D7.5	Reports on the impact and outcome of the organized promotion events.	7	4	4.00	R	PU	36
D7.6	Final report on NAVOLCHI dissemination and promotion activities	7	4	4.00	R	RE	36
D7.7	Dissemination kit	7	4	6.00	O	PU	36
Total				320.00			

## **Information Management**

### *Communications*

#### **Conference Calls**

Because of its superior sound quality, we have chosen <http://www.conferencegenie.co.uk> until a better solution is proposed.

Use the following conference room:

Passcode	503928
UK	0844 84 84 84 0
Austria	0820 401 15473
France	082 123 1046
Germany	01805 123 0131
Australia	04242 15518
All other countries	+44 844 873 60 60 or +49 1803 002 063

#### **Mailing Lists**

For emails concerning all, use  
[navolchi@lists.kit.edu](mailto:navolchi@lists.kit.edu) (e.g. to announce meetings)

To address only people working on administrative issues, use  
[navolchi\\_ga@lists.kit.edu](mailto:navolchi_ga@lists.kit.edu) (General Assembly)  
[navilchi\\_pmc@lists.kit.edu](mailto:navilchi_pmc@lists.kit.edu) (Project Management Committee)

Each Party needs to assure that emails from at least all the Members of the GA and PMC will pass their spam filter.

#### **Confidentiality**

In short: Everything is confidential except if marked otherwise. See exceptions below.

All information in whatever form or mode of transmission, which is disclosed by a Party (the “Disclosing Party”) to any other Party (the “Recipient”) in connection with the Project during its implementation or during the Project proposal discussions and which has not been explicitly marked as “non-confidential”, or when disclosed orally, has been identified as non-confidential at the time of disclosure and has been confirmed and designated in writing within 15 days from oral disclosure at the latest as non-confidential information by the Disclosing Party, is “Confidential Information”.

The Recipients shall be responsible for the fulfilment of the above obligations on the part of their employees and shall ensure that their employees remain so obliged, as far as legally possible, during and after the end of the Project and/or after the termination of employment.

#### *Exceptions*

The above shall not apply for disclosure or use of Confidential Information, if and in so far as the Recipient can show that:

- the Confidential Information becomes publicly available by means other than a breach of the Recipient’s confidentiality obligations;
- the Disclosing Party subsequently informs the Recipient that the Confidential Information is no longer confidential;
- the Confidential Information is communicated to the Recipient without any obligation of confidence by a third party who is in lawful possession thereof and under no obligation of confidence to the Disclosing Party;
- the disclosure or communication of the Confidential Information is foreseen by provisions of the EC-GA;
- the Confidential Information, at any time, was developed by the Recipient completely independently of any such disclosure by the Disclosing Party; or
- the Confidential Information was already known to the Recipient prior to disclosure;
- the Confidential Information is required to be disclosed by binding applicable laws or regulations or binding court or administrative order, see [3].

*Electronic communication*

For the electronic communication of obviously important Project results or key documents on intellectual property, as well as detailed engineering information, it is recommended to use encryption.

**Website [www.navalchi.eu](http://www.navalchi.eu)**

IMT - Karlsruhe Institute of Technology (KIT)

Introduction Partners Publications Positions **Restricted**

**Member Area - Confidential Content**

Dates and Meetings **Deliverables, Milestones and Current State** Contact and Communication  
 Project Documents EC-related Documents Announcements

Deliverables, Milestones and Current State

Status levels: **finished** under progress due critical

Deliverable		WP	Partner	Type	Diss	Delivery	
Nr.	Title					Mnth	Date
D1.1	Project web site with .eu domain (M01) and continuous update	1	KIT	O	PU	1	11/2011
D1.2	Project reference online manual	1	KIT	O	RE	3	01/2012
D2.1.	Definition of chip-to-chip interconnection system environment and specification	2	ST	R	RE	3	01/2012
D1.3	Project quality assurance manual	1	KIT	O	RE	6	04/2012
D5.1	DDCM Specification document	5	ST	R	CO	6	04/2012

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**Figure 3 Screenshot of [www.navalchi.eu](http://www.navalchi.eu), page ‘Restricted/Deliverables, Milestones and Current State’**

The NAVOLCHI website contains a public area with

- Press releases

- Publications, etc.
- Open positions

And a restricted area with access only<sup>5</sup> to NAVOLCHI partners, containing

- Contact list, who is part of which mailing list
- Overview over milestones and deliverables, marked when due
- Slides of meetings
- Next dates for meetings and publication / promotion events
- Documents (Consortium Agreement, Annex I, templates)
- ...to be extended

### ***Templates and Documents***

For the exchange of documents with sensitive content via email please use encryption, as provided by e.g. a file archiver like [www.7-zip.org](http://www.7-zip.org) and its feature AES-256 encryption. Communicate the password by phone.

The use of templates is recommended, whenever provided (especially for reports, deliverables), often to be found at the NAVOLCHI website.

When mentioning dates and numbers these will be interpreted as in North American English when in doubt, e.g. 01/02/2010 means February 2 and 20,000 means  $2 \cdot 10^4$ .

Supply original images with the document when editing of the figures might be necessary. It presents an advantage, if figures come along with caption and rights, e.g. if they are free for EC and Consortium to use.

When revising documents it is good practice to

- |   |
|---|
| <ul style="list-style-type: none"><li>• Add the editor's name to the file name</li><li>• Assure that the file which is send back has a different file name (e.g. include version number, date) than the original.</li></ul> |
|---|

### ***Deliverable Review and Approval Process***

Official documents and deliverables have to be reviewed and approved by the PMC. To reduce the effort the PMC can decide to assign a smaller number of reviewers which have to be part of the Consortium.

If the document / deliverable is going to be published, all rules on publication apply.

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<sup>5</sup> secured with https



## Reports

General report review process:

1. Author sends first draft to task members + WP leader for review at same time  
→ One week for feedback
2. Second review by Project Management Committee  
→ One week for review

First draft has to be ready 2 weeks before deadline (ideally).

### *Deliverable Reports and Milestone Reports*

Please refer to the lists for deliverables and milestones. Templates are available on the NAVOLCHI web site.

### *Intermediate Report – after 9 and 27 months*

Each partner fills out the corresponding template and hence provides 2-3 pages (dependent on how many tasks are active) on

- Performed technical and management activities, listing contributor's names and effective time spent on the project,
- Difficulties, milestones and deliverables (or contributions to deliverables in case of joined deliverables) that have been reached,
- Tabular comparison between targeted, achieved performance and the state-of-the-art
- Patents, publications, travels, visits,
- The report summarizes all costs that have incurred
  - with quantitative inventory of spent manpower and expenses (travels, equipment, consumables, etc.)
  - in addition to providing numbers on money spent (eligible costs, i.e. without VAT) it is interesting from a project management's point of view to learn to know the estimated amount of funding, which is expected to be used to partly cover the costs.

This input of all partners is compiled into the actual IMR and send for revision and confirmation to the partners, before handing it to the EC.

### ***Periodic Activity Report – after 18 and 36 months***

This type of report has to be filed within 60 days after the end of a reporting period, see next table.

**Table 3 Tentative schedule of project reviews**

<b>Review no.</b>	<b>Tentative timing, i.e. after month X = end of a reporting period <sup>6</sup></b>	<b>planned venue of review</b>	<b>Comments , if any</b>
<b>1</b>	After project month: 18	<b>Karlsruhe, Germany</b>	
<b>2</b>	After (last) project month: 36	<b>Karlsruhe, Germany</b>	<b>Called final report</b>

These reports include:

- A progress report summarizing progress of the NAVOLCHI project, including a publishable summary, achievements with respect to the objectives, deliverables and milestones, as well as deviations from Annex I of [1].
- Explanation on the use of resources
- Financial statements (From C and Summary financial report) , audit certificates if necessary

### ***Final Report – after 36 months***

This report includes:

- Publishable Summary Report, summarizing results, conclusions and socioeconomic impact of the NAVOLCHI project.
- A Report which covers wider societal implications of the NAVOLCHI project, including gender aspects (equality actions), ethical issues, efforts to involve other actors and spreading of awareness as well as the plan for use and dissemination of foreground.

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<sup>6</sup> Month after which the review will take place. Month 1 marking the start date of the project, and all dates being relative to this start date.

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## References

- [1] EC-Grant Agreement No288869 (principal contract with EC)
- [2] Annex I to [1], called Description of Work (workplan as proposed to the EC)
- [3] NAVOLCHI Consortium Agreement (contract among the partners)

- [4] Guide to Financial Issues relating to FP7 Indirect Actions  
[ftp://ftp.cordis.europa.eu/pub/fp7/docs/financialguide\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/docs/financialguide_en.pdf)
- [5] Guide to Intellectual Property Rules for FP7 projects  
[ftp://ftp.cordis.europa.eu/pub/fp7/docs/ipr\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/docs/ipr_en.pdf)
- [6] Guidance Notes on Project Reporting  
[ftp://ftp.cordis.europa.eu/pub/fp7/docs/project\\_reporting\\_en.pdf](ftp://ftp.cordis.europa.eu/pub/fp7/docs/project_reporting_en.pdf)
- [7] Templates..., see [www.navolchi.eu](http://www.navolchi.eu) (see restricted area)