FIT-4-NMP

Strategic and targeted support
to incentivise talented newcomers
to NMP projects under Horizon Europe

How to write Section 3 “Implementation”

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Section 3: Implementation

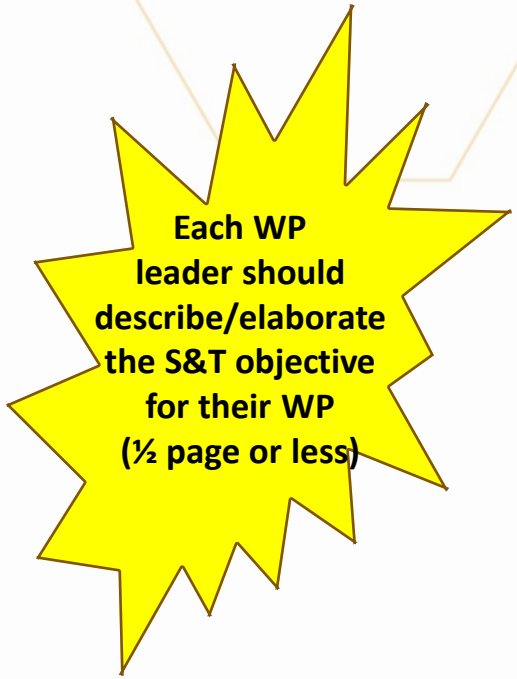
- Section 3.1: Work plan and resources
  - EC recommended length: 14 pages – including tables

- Section 3.2: Capacity of participants and consortium as a whole
  - EC recommended length: 3 pages

Section 3.1: Work plan and resources (14 pages)

1. Provide brief presentation of the overall structure of the work plan;
2. Provide timing of the different work packages and their components (Gantt chart or similar);
3. Provide graphical presentation of the components showing how they inter-relate (Pert chart or similar).
4. Provide detailed work description, i.e.:
   - a list of work packages (table 3.1a);
   - a description of each work package (table 3.1b);
   - a list of deliverables (table 3.1c); Distribute evenly over the project
5. Provide a list of milestones (table 3.1d); Distribute evenly over the project
6. Provide a list of critical risks, relating to project implementation, that the stated project's objectives may not be achieved. Detail any risk mitigation measures. You will be able to update the list of critical risks and mitigation measures as the project progresses (table 3.1e); Rule of thumb: describe at least two critical risks per work package
7. Provide a table showing number of person months required (table 3.1f);
8. Provide a table showing description and justification of subcontracting costs for each participant (table 3.1g);
9. Provide a table showing justifications for 'purchase costs' (table 3.1h) for participants where those costs exceed 15% of the personnel costs (according to the budget table in proposal part A);
10. Provide, if applicable, a table showing justifications for 'other costs categories' (table 3.1i);
11. Provide, if applicable, a table showing in-kind contributions from third parties (table 3.1j)

3.1: Work plan and resources



1. Excellence

1.1 Objectives

- Scientific and Technological (S&T) Objective 1
- S&T Objective 2
- S&T Objective 3
- S&T Objective 4

3. Implementation

3.1 Work Plan

- WP1: Tasks to achieve S&T Objective 1
- WP2: Tasks to achieve S&T Objective 2
- WP3: Tasks to achieve S&T Objective 3
- WP4: Tasks to achieve S&T Objective 4
- WP5: Dissem., Exploit. & Communication
- WP6: Project Management

Section 3.1: Work plan and resources
Work Package Description

See
MS Word file!

Section 3.1: Work plan and resources

Work Plan Timing

		WP/Task Leader	Task Support	Month 1–36
WP1	**Shielded Emitter**	**Merck**		MS1.1 (18), MS1.2 (30)
T1.1	Shielding substituents	Merck	-	D1.2 (12), D1.4 (18)
T1.2	Emissive core structure	Merck	UDUR	D1.3 (16)
T1.3	Shielded deep blue emitter	Merck	UDUR	D1.5 (30)
T1.4	Estimate shielding efficiency	Merck	UDUR	D1.1 (6)
WP2	**TADF Host**	**UDUR**		MS2.1 (6), MS2.2 (24), MS2.3 (30)
T2.1	Synthesise ICT molecules with high triplet levels	UDUR	Merck	D2.1 (6), D2.2 (12), D2.3 (18)
T2.2	Batch scale synthesis and purification routes for new materials	UDUR	Merck	D2.4 (24), D2.5 (36)
T2.3	Changing molecular shape to induce higher degrees of self-ordering	UDUR	IOF	
WP3	**Photo-physical Characterisation**	**UDUR**		MS3.1 (12), MS3.2 (24), MS3.3 (30), MS3.4 (36)
T3.1	Elucidate photo-physics of shielded emitters	UDUR	Merck and IOF	D3.1 (12)
T3.2	Determine photo-physical and energetic characteristics of TADF hosts	UDUR	Merck and IOF	D3.2 (24), D3.3 (30)
T3.3	Elucidate energy and electron transfer mechanisms	UDUR	Merck and IOF	D3.4 (30)
T3.4	Determine microcavity and orientation effects on energy transfer	UDUR	Merck and IOF	D3.5 (36)
WP4	**Optical Anisotropy**	**IOF**		MS4.1 (18), MS4.2 (36)
T4.1	Anisotropic dispersion of organic thin films in encapsulated samples	IOF	Merck and UDUR	D4.1 (6)
T4.2	…mentation and internal emission spectra	IOF	Merck and UDUR	D4.2 (12)
T4.3	…tation ensemble average for different emitter systems	IOF	Merck and UDUR	D4.3 (18)
T4.4	…imulation model of energy transfer inside an OLED	IOF	Merck and UDUR	D4.4 (24)
T4.5	Experimental verification of energy and anisotropy effects	IOF	Merck and UDUR	D4.5 (30), D4.6 (36)
WP5	**Hyperfluorescence OLEDs**	**Merck**		MS5.1 (6), MS5.2 (12), MS5.3 (18), MS5.4 (33), MS5.5, MS5.6, MS5.7 (36)
T5.1	…stablish reference material system	Merck	UDUR and MOD	D5.1 (12)
T5.2	Evaluate consortium materials and optimise stack	Merck	UDUR	D5.2 (18), D5.8 (36)
T5.3	"High throughput" characterisation	Merck	UDUR and IOF	D5.3 (18)
T5.4	Model emission layer	Merck	UDUR and IOF	D5.5 (24)
T5.5	Develop white OLED stack	Merck	MOD and IOF	D5.6, D5.7 (33)
T5.6	…onduct life cycle assessment for OLED stacks	Intelligentsia	Merck and MOD	D5.9 (36)
WP6	**Hyperfluorescence Microdisplays**	**MOD**		MS6.1 (13), MS6.2 (18), MS6.3 (34)
T6.1	Specifications	MOD	Merck	D6.1 (2), D6.2 (20)
T6.2	Microdisplay demonstration	MOD	Merck	D6.3 (34)
WP7	**Dissemination and Exploitation**	**Intelligentsia**		MS7.1 (3)
T7.1	Produce a data management plan	Intelligentsia	-	D7.1 (3), D7.4 (18), D7.7 (36)
T7.2	Create and maintain a project website	Intelligentsia	-	D7.2 (3)
T7.3	Create project promotional material	Intelligentsia	-	D7.3 (3)
T7.4	Protect intellectual property	MOD	All	D7.5 (18), D7.8 (36)
T7.5	Disseminate achieved scientific and technological results	MOD	All	
T7.6	Produce exploitation plan	MOD	All	D7.6 (18), D7.9 (36)
T7.7	Cooperate with related European research actions	Intelligentsia	All	
WP8	**Project Management**	**Merck**		MS8.1 (1), MS8.2 (18), MS8.3, MS8.4 (36)
T8.1	Collate deliverables, milestones and reports	Merck	Intelligentsia	D8.2 (18), D8.3 (36)
T8.2	Manage legal, contractual, financial, ethical and administrative matters	Merck	Intelligentsia	D8.1 (2)
T8.3	Ensure communication between partners	Intelligentsia	All	
T8.4	Manage scientific and technical activities	Merck	All	
T8.5	Organise project steering committee meetings	Merck	Intelligentsia	

Deliverables ◆
Milestones ✦

Deliverables and milestones distributed "evenly" across the project

Section 3.1: Work plan and resources
Critical Risks

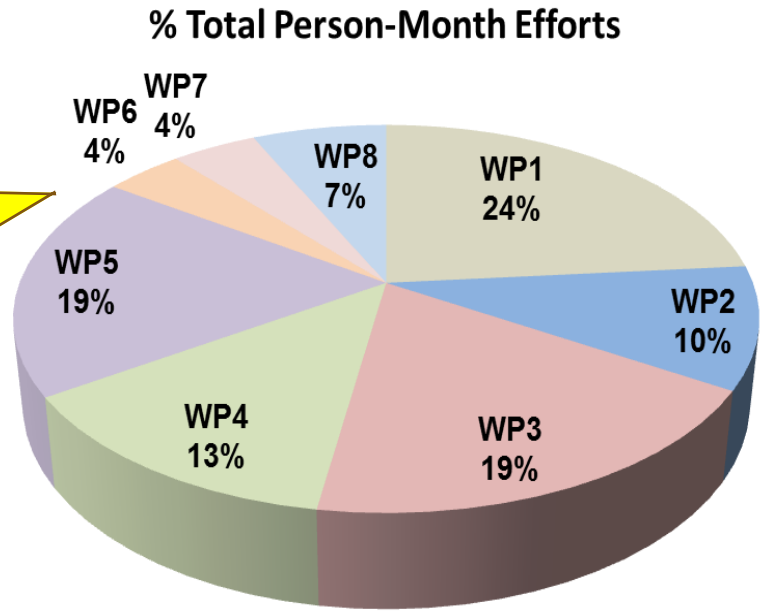
Risk No.	Description of Risk	WP(s)	Risk Rating	Proposed Risk Mitigation Measures
1	Molecular weight of shielded components could be too high for processing by thermal evaporation.	1	Low	Use compounds in OLEDs processed from solution.
2	If Dexter transfer is efficiently prevented by shielding, Forster coupling could be reduced to a level where efficient energy transfer from the TADF to the shielded emitter is not sufficient.	1	Low	The relative orientation of TADF to fluorescent core has to be optimised very carefully => shift resources to investigation of orientation and anisotropy effects.
3	New material designs cannot be synthesised.	2	Low	UDUR has developed many of the synthetic routes to D-A-D systems, especially the acceptor units, so varied approaches to the target molecules are in place to mitigate failure of one strategy.
4	Sufficiently high purity of materials cannot be achieved.	2	Low	UDUR has state-of-the-art facilities to analyse materials to determine impurities and a sublimation facilities in Physics for high quality purification. Multiple routes to materials exist to provide work-arounds to eliminate impurities that are impossible to separate.
5	Efficient fluorescence emitters will have weak or no phosphorescence making measurement of their triplet states difficult.	3	Med	UDUR has shown that steady state photo-induced absorption can be used to measure dark states in D-A-D molecules and will introduce time resolved measurements in this project to enable the dynamics to be measured.
6	Host and / or guest molecules do not show FRET.	3	Low	Change shielding to reduce their separation.
7	Host and / or guest molecules do not orient.	3	Low	Induce enhanced orientation using inert substituents.
8	Etc.	4	Etc.	Etc.

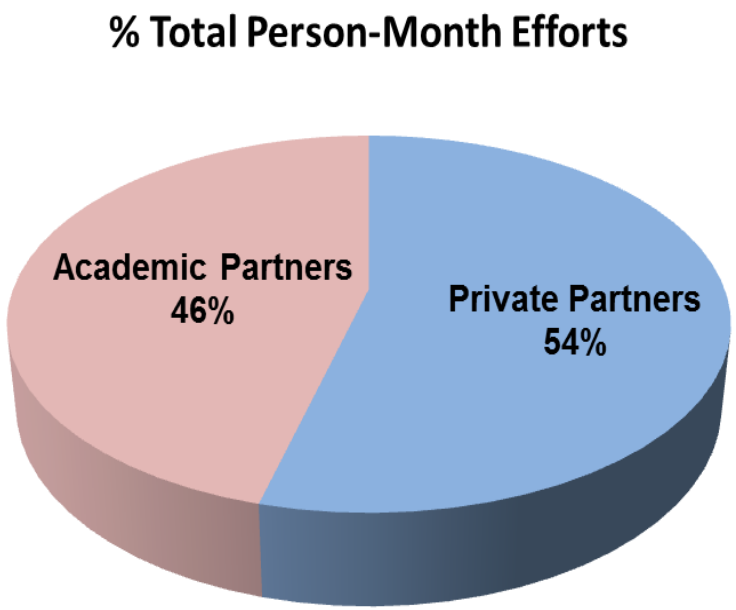
Rule of thumb: at least two risks per WP!

Section 3.1: Work plan and resources
Budget

Distribution of efforts (%)

5-7% of efforts (person-months) for Project Management (WP8)





- Concentration of efforts in WPs 1, 2, 3 and 4 reflects the project's strong focus on development of advanced materials, design and modelling tools and is in line with the call's scope.
- Several tasks/efforts (e.g. Task 5.5) in WP5 also directly contribute to WP6.
- Project management efforts (WP8) consistent with typical EU collaborative R&D projects.
- Good balance between efforts for academic partners (IOF and UDUR) and private partners (Merck, MOD and INT) also reflects the general balance between research and innovation tasks.

Section 3.2: Capacity of participants and consortium as a whole (3 pages)

1. Describe the consortium. How does it match the project's objectives, and bring together the necessary disciplinary and inter-disciplinary knowledge. Show how this includes expertise in social sciences and humanities, open science practices, and gender aspects of R&I, as appropriate. Include in the description affiliated entities and associated partners, if any.
2. Show how the partners will have access to critical infrastructure needed to carry out the project activities.
3. Describe how the members complement one another (and cover the value chain, where appropriate)
4. In what way does each of them contribute to the project? Show that each has a valid role, and adequate resources in the project to fulfil that role.
5. If applicable, describe the industrial/commercial involvement in the project to ensure exploitation of the results and explain why this is consistent with and will help to achieve the specific measures which are proposed for exploitation of the results of the project (see section 2.2).
6. Other countries and international organisations (based in a country or is an international organisation that is not automatically eligible for such funding).

Section 3.2: Capacity of participants and consortium as a whole (1 of 4)

Participant no.	Participant organisation name	Part. short name	Country
1 (co-ordinator)	Merck KGaA	Merck	Germany
2	MICROOLED S.A.S	MOD	France
3	Fraunhofer Institute for Applied Optics and Precision Engineering	IOF	Germany
4	Durham University	UDUR	UK
5	Intelligentsia Consultants Sarl	Intelligentsia	Luxembourg

Participant no.	Participant organisation name	Part. short name	Country
1 (co-ordinator)	MZ Denmark GmbH	MOZ	Germany
2	Ericsson AB	ERI	Sweden
3	F-Secure Oyj	FSEC	Finland
4	Intel Deutschland GmbH	INT	Germany
5	Intelligentsia Consultants Sarl	IC	Luxembourg
6	Luminem SRLs	LUM	Italy
7	Mind SRL	MIND	Italy
8	Riots Global Oy	RIO	Finla
9	Sensative AB	SEN	Swede
10	Consiglio Nazionale delle Ricerche	CNR	
11	RISE Research Institutes of Sweden AB	RISE	Sw
12	Centria Ammattikorkeakoulu Oy	CEN	
13	Politecnico di Torino	POL	

Participant no.	Participant organisation name	Part. short name	Country
1 (co-ordinator)	Technische Universiteit Delft	TUD	Netherlands
2	Technische Universiteit Eindhoven	TUE	Netherlands
3	Rheinisch-Westfälische Technische Hochschule Aachen	RWTH	Germany
4	Institut National de Recherche en Informatique et en Automatique	INRIA	France
5	Eidgenössische Technische Hochschule Zürich	ETHZ	Switzerland
6	Stichting IMEC Nederland	IMEC	Netherlands
7	ARM Limited	ARM	UK
8	IBM Research GmbH	IBM	Switzerland
9	Intelligentsia Consultants Sarl	INT	Luxembourg

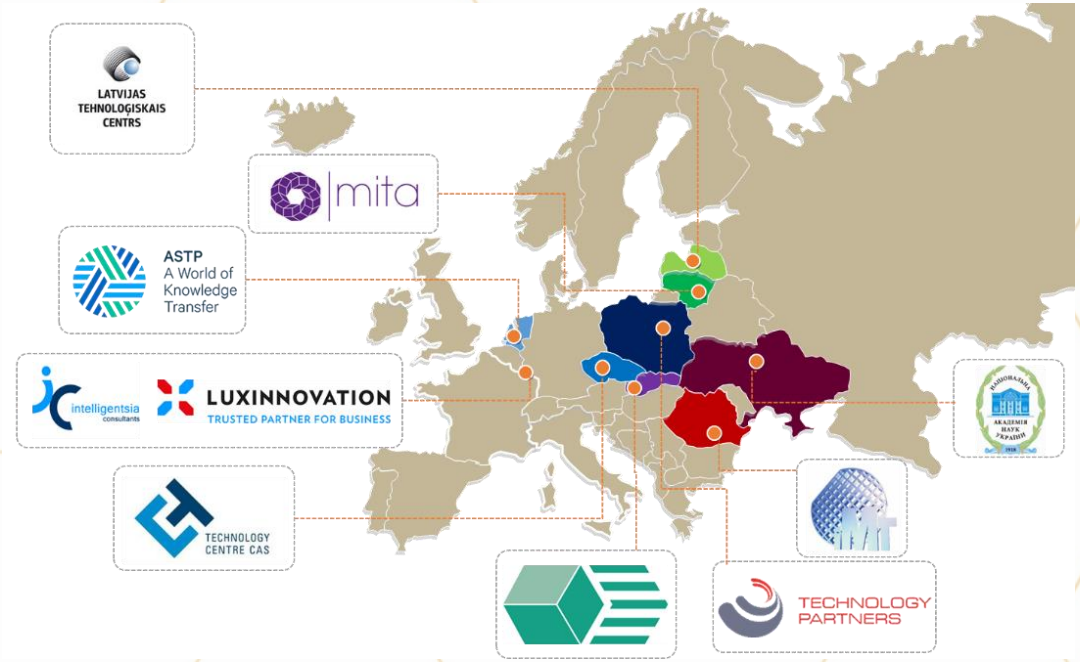
Participant no.	Participant organisation name	Part. short name	Country
1 (co-ordinator)	Intelligentsia Consultants *Sàrl*	Intelligentsia	Luxembourg
	Novaled GmbH	Novaled	Germany
3	Astron Fiamm Safety *Sàrl*	Astron-FIAMM	France
4	University of Durham	UDUR	UK
5	Technische Universität Dresden	TUD	Germany
6	Kauno Technologijos Universitetas	KTU	Lithuania

Important to include companies across value chain

Section 3.2: Capacity of participants and consortium as a whole (2 of 4)

OLED Materials	OLED Stacks	OLED Micro-displays
• Shielded Emitter (Merck) • TADF Host (UDUR) • Photo-physical Characterisation (UDUR)	• Hyper-fluorescence OLEDs (Merck) • Optical Anisotropy (IOF)	• Hyper-fluorescence Microdisplays (MOD)

EU Project Management and Dissemination Support (Intelligentsia)



Section 3.2: Capacity of participants and consortium as a whole (3 of 4)

Example: The project's scientific and technical objectives are perfectly aligned with the consortium partners' capabilities, contributions and complementarities:

No.	Scientific and Technical Objectives	Partner's Capabilities, Contributions and Complementarities
1	Develop new algorithmic solutions for targeted applications for CIM architecture	**IBM (WP leader)** is a pioneer of cognitive computing. The company has formed a new business unit called IBM Watson in 2014 offering services for data analytics and IoT. **TUD (Task leader)** has a strong record in developing and optimising healthcare (genomics and DNA sequencing) and data science algorithms for accelerated multi-core platforms.
2	Develop and design new mapping methods integrated in a framework for efficient compilation of the new algorithms into CIM macro-level operations	**INRIA (WP leader)** has extensive experience with the design and implementation of aggressive optimizations and analyses, including production compilers like Clang/LLVM and domain-specific code generators. **TUE (Task leader)** is specialised in research on low power single and multi-processor architectures, their programmability, and the predictable design of soft- and hard real-time systems.
3	Develop a macro-architecture based on the integration of group of CIM tiles	**TUE (WP leader)** is specialised in research on low power single and multi-processor architectures, their programmability, and the predictable design of soft- and hard real-time systems. **ETHZ (Task leader)** has a proven track record of working on novel processor and memory architectures.
4	Develop and demonstrate the micro-architecture level of CIM tiles and their models	**RWTH (WP leader)** has one of the World's leading groups on the process technology and basic physical-chemical understanding of functional oxide thin films w.r.t future integrated nanoelectronic devices, especially redox-based resistive switching memories (70+ papers, 3000+ citations). **IMEC (Task leader)** has past experience to lead the development of memristor crossbar based logic/ arithmetic and memory circuit design and simulation.
5	Design a simulator and FPGA emulator for the new architecture in order demonstrate its superiority	**ARM (WP leader)** is a world-renowned semiconductor IP company with around 3000 employees. ARM partners have shipped over 50 billion ARM microprocessors. The company has a strong track record on embedded processors, IoT devices, power-efficient server and HPC chips. **TUD (Task leader)** has a research focus on In-Memory Computing and targets the development, design and demonstration of new architecture paradigms to enable low energy and/or high throughput computing. TUD has a proven track record of implementing demonstrators.

Section 3.2: Capacity of participants and consortium as a whole (4 of 4)

The consortium partners will be able to effectively implement the MNEMOSENE project, because they have extensive past experience of working together on international research projects including:

- FP7 ENCORE involving TUD and ARM (2010-2013)
- H2020 ExaNode involving ARM and ETHZ (2015-2018)
- H2020 Antarex involving ETHZ and INRIA (2015-2018)
- H2020 neuRAM3 involving IMEC and IBM (2016-2018)

Their collaborative research work will also be facilitated by:

- Many researchers and engineers knowing each other on a personal level
- Management and technical issues being discussed during quarterly steering committee meetings
- Face-to-face consortium meetings occurring every six months
- Regularly using email, phone and Skype to communicate over the duration of the project