Challenge 2: Cognitive Systems and Robotics

FP7 ICT Call 10 – NCP briefing

Brussels
19-20 June 2012

Outline

- *Background*
- *Objectives in call10*
- *Answer to your questions*

BACKGROUND

Cognitive Sysytems and Robotics: Project Portfolio

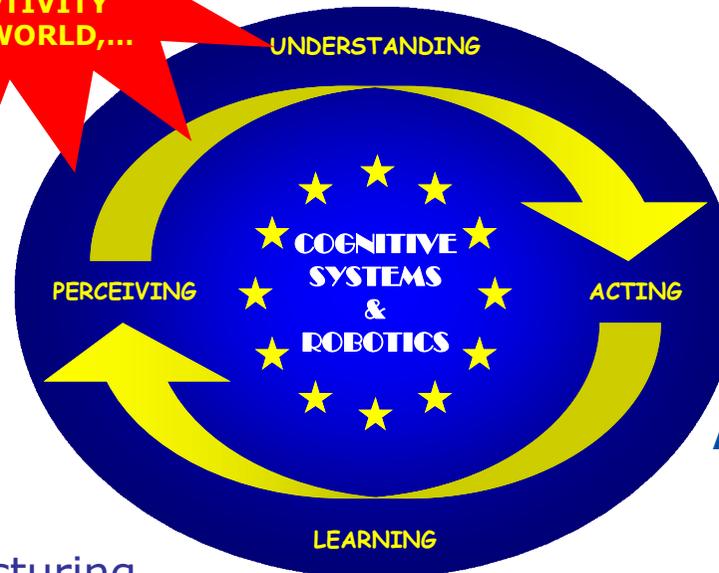http://cordis.europa.eu/fp7/ict/cognition/projects/areas-projects_en.html

**ROBUSTNESS
AUTONOMY
ADAPTIVITY
REAL-WORLD,...**

PERCEIVING
➢ Touching
➢ Seeing
➢ Hearing
➢ Advanced sensing

UNDERSTANDING
➢ Recognising
➢ Interpreting
➢ Adapting
➢ Modelling
➢ Cognitive architectures

APPLICATION AREAS
➢ Aerial
➢ Underwater
➢ Industry and manufacturing
➢ Professional & domestic
➢ Medical and rehabilitation
➢ Monitoring and surveillance

UNDERSTANDING

PERCEIVING

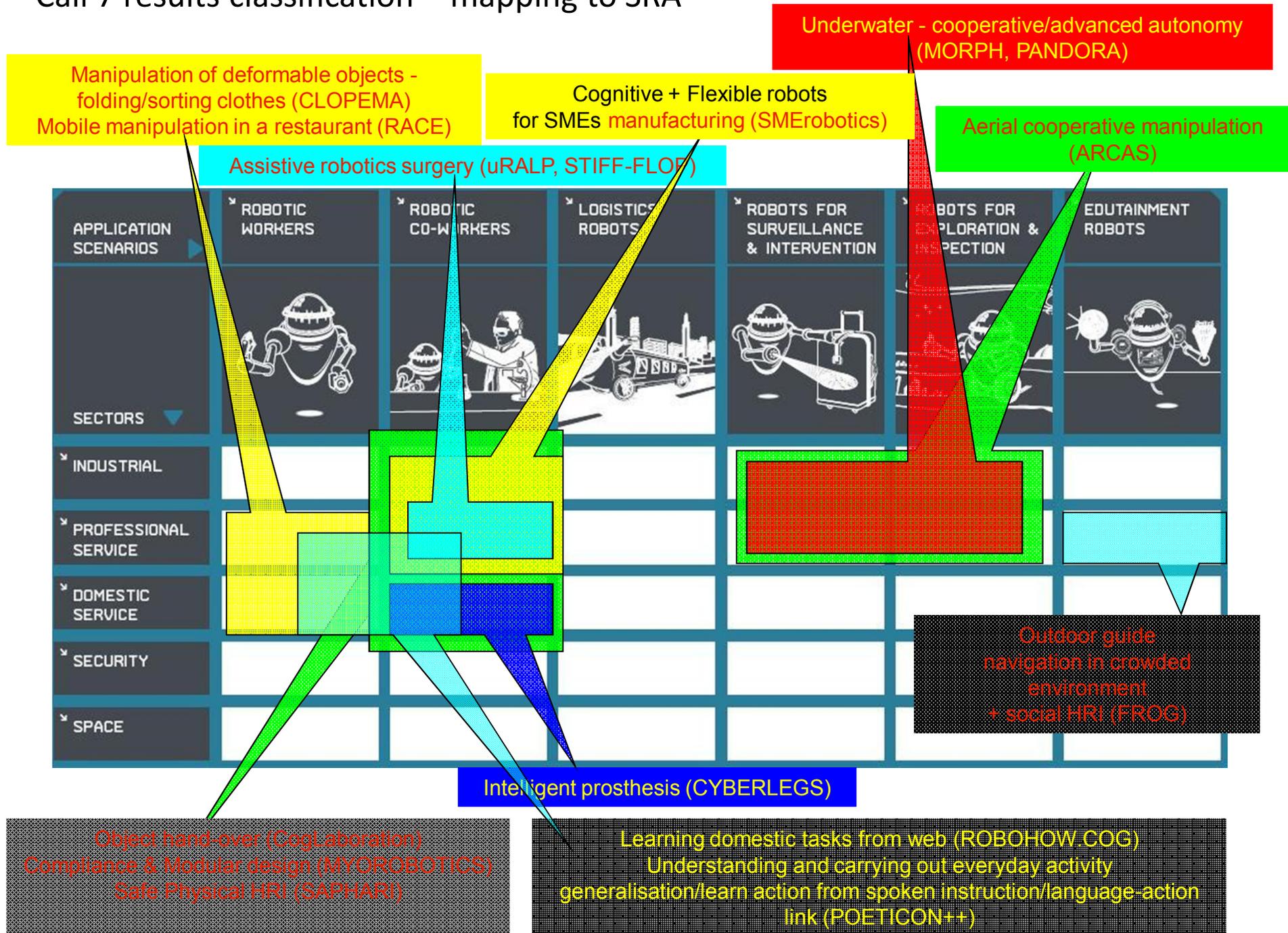**COGNITIVE SYSTEMS & ROBOTICS**

ACTING

LEARNING

ACTING
➢ Manipulating
➢ Navigating
➢ Interacting
➢ Collaborating
➢ Monitoring

4

Cognitive Systems and Robotics in FP7 (2007-2012)

Work Programme	Objective	Call (Evaluation)	Budget	Projects: ACS & Robotics (total)
2007-2008	ICT-2007.2.1 (ICT-2007.2.2): Cognitive Systems, Interaction, Robotics	ICT Call 1 (2007)	96 M€	17 (27)
		ICT Call 3 (2008)	97 M€	17 (23)
2009-2010	ICT-2009.2.1: Cognitive Systems and Robotics *)	ICT Call 4 (2009)	73 M€	19
		ICT Call 6 (2010)	80 M€	22
2011-2012	ICT-2011.2.1: Cognitive Systems and Robotics	ICT Call 7 (2011)	73 M€	16
		ICT Call 9 (2012)	82 M€	??

*) No more interaction since 2009 - language-based interaction in a separate objective with its own budget

Call 7 results classification – mapping to SRA

Underwater - cooperative/advanced autonomy (MORPH, PANDORA)

Manipulation of deformable objects - folding/sorting clothes (CLOPEMA)
Mobile manipulation in a restaurant (RACE)

Cognitive + Flexible robots for SMEs manufacturing (SMErobotics)

Aerial cooperative manipulation (ARCAS)

Assistive robotics surgery (uRALP, STIFF-FLOP)

APPLICATION SCENARIOS

ROBOTIC WORKERS

ROBOTIC CO-WORKERS

LOGISTICS ROBOTS

ROBOTS FOR SURVEILLANCE & INTERVENTION

ROBOTS FOR EXPLORATION & INSPECTION

EDUTAINMENT ROBOTS

SECTORS

INDUSTRIAL

PROFESSIONAL SERVICE

DOMESTIC SERVICE

SECURITY

SPACE

Outdoor guide navigation in crowded environment + social HRI (FROG)

Intelligent prosthesis (CYBERLEGS)

Object hand-over (CogLaboration)
Compliance & Modular design (MYOROBOTICS)
Safe Physical HRI (SAPHARI)

Learning domestic tasks from web (ROBOHOW.COG)
Understanding and carrying out everyday activity generalisation/learn action from spoken instruction/language-action link (POETICON++)

Call 6 results classification – mapping to SRA

SENSOR NETWORK MONITORING CONTROL INTELLIGENT BUILDING (Sensei)

SURGICAL ROBOT (ACTIVE – I-SUR)

LOGISTICS (RobLog)

UNDERWATER (NOPTILUS / CoCoRo) Search& Rescue/ Unmanned (EMICAB) UAV – ML (ComPLACs)

flexible object manipulation, packaging industry, medical applications (eg prosthetic devices) (TOMSY)
Robot-arm/ML (ComPLACS)
Assembly (DARWIN/Intellact)

ROBOT BUILDER (Goal-Leaders)

APPLICATION SCENARIOS ▶

ROBOTIC WORKERS

ROBOTIC CO-WORKERS

LOGISTICS ROBOTS

ROBOTS FOR SURVEILLANCE & INTERVENTION

ROBOTS FOR EXPLORATION & INSPECTION

EDUTAINMENT ROBOTS

SECTORS ▼

INDUSTRIAL

PROFESSIONAL SERVICE

DOMESTIC SERVICE

SECURITY

SPACE

CORBYS: MOBILE MANIPULATION / eSMCS / CORBYS: REHAB
Xperience: HOUSEHOLD HELPER
NeuralDynamics: HR COOPERATION TABLETOP – robotics arm

VR of Space manipulation(Intellact)

EFAA: Game/table-top
JAMES: social HRI - Bar tender
TOMSY: computer animation
eSMCS: Gaming for Rehabilitation
SpaceBook: Navigation support

V-Charge: autonomous valet parking eCAR

RUBICON: assisted living /transport of goods

••• 7

OBJECTIVES IN CALL10

1) IMPROVE EUROPEAN COMPETITIVENESS
2) BETTER SERVE THE COMMUNITY: Scientific & European Industry
3) BETTER SERVE the European citizens

– *Strengthen Europe S&T capital*

– *How to make **sciences meeting the industry** and **industry helping scientific** progress? How to transfer scientific results to real life?*

– *How to further support the community, prepare for H2020 (PPP*, PcP*, INCO*), increase visibility also to the public and decision-makers?*

SCIENTIFIC EXCELLENCE + STRONG COHESION R ⇔ D ⇔ I

PPP=Publc-private partnership, PcP – Pre-commercial procurement, INCO- international cooperation

Challenge 2 in Call 10

1. *continue research to strengthen Europe's scientific and technical capital in the domain, by progressing advanced functionalities and cognitive capabilities of robotic systems and by extending this research to smart spaces and symbiotic human-machine interactions;*

2. *introduce a special emphasis on systems integration, through use cases which exploit and support the uptake by industries of promising technologies on an international scale.*

FP7 - ICT Call 10

OBJECTIVE	ICT-2013.2.1 Robotics, Cognitive Systems & Smart Spaces, Symbiotic Interaction
PUBLICATION	CALL 10
DEADLINE	CALL 10
BUDGET	67 M€ - Min. 52M€ for a) and b) – Min. 10M€ for c) - Min. 40% IPs - Min 25% STREPs

- Target (a) Intelligent robotics systems (IP, STREP)

- Target (b) Cognitive systems and smart spaces (IP, STREP)

- Target (c) Symbiotic human-machine interaction(IP, STREP)

Objective 2.1:
Robotics, Cognitive Systems & Smart Spaces, Symbiotic Interaction

a) *Intelligent robotics systems*
- *advanced robotics functionalities*
- *new levels of capabilities in perception, understanding and action*
- *robots will be of various shapes and sizes*
- *validated in real-life situations*

b) *Cognitive systems and smart spaces*
- *advanced cognitive systems research*
- *sensing, perception, understanding, learning, reasoning and action*
- *smart spaces consisting of infrastructures, intelligent interfaces and robots*
- *novel, intuitive, immersive interactions between the environment, objects in the environment, machines and users*

c) *Symbiotic human-machine interaction*
- *interactive technologies based on new theories and models of human cognition and emotion, non-rational decision-making, social behaviour and spatial and temporal perception and processing*

Objective 2.1: Expected impact

> *increase Europe's market share in industrial and service robots*

> *increase involvement of industries*

> *strengthen links between industry and academia*

FP7 - ICT Call 10

OBJECTIVE	ICT-2013.2.2 Robotics use cases & Accompanying measures
PUBLICATION/ DEADLINE	CALL 10 (dates tbc)
BUDGET	STREPS: 20M€ / CSAs: 3M€

- ROBOTICS USE-CASES (STREP):

  - Target (a) Use-cases in service robots

- ACCOMPANYING MEASRURES (CSA):

  - Target (b) Robotics research roadmap coordination and socio-economic aspects

  - Target (c) Robotics networking

  - Target (d) Dissemination and Outreach

Objective 2.2:
Robotics use cases & Accompanying measures

a) *Use-cases in service robots*
   - *test and validate promising robotics applications*
   - *new industry sectors which have not used robotics so far*

b) *Robotics research roadmap coordination and socio-economic aspects*
   - *develop strategic roadmaps with relevant stakeholders*
   - *preparing a robotics PPP*

c) *Robotics networking*
   - *flexible mechanisms to exchange knowledge and skills within and beyond the EU*
   - *help identify new users and markets and new research areas*
   - *establish a strategy towards sustainable international cooperation in robotics*
   - *focussing initially on the United States*

d) *Dissemination and Outreach*
   - *increase the general level of public awareness of robotics*

b), c) and d) may be covered by one or several CSAs as appropriate

Objective 2.2: Expected impact

➢ *Higher use of robotics - industry and user-driven*

➢ *Successful technology transfer*

➢ *Increased visibility*

Why service robotics?

➢ *Great opportunities for growth*

- *domestic services robot market grew by 26% in 2010, and its growth is expected to accelerate to over 60% in the coming years.*
- *professional service robotics market is forecast to grow by 60% in the next years*

➢ *European strengths and weaknesses*

- *European suppliers of professional service robots have around 50 % of world market share*
- *Europe is still competitive in high-end home appliances but these industries have not fully embraced robotics technology yet: Europe supplies only around 10% of the domestic service robots market.*

Towards Horizon 2020: PPP in robotics

Basic Research → R&D → Innovation → Uptake
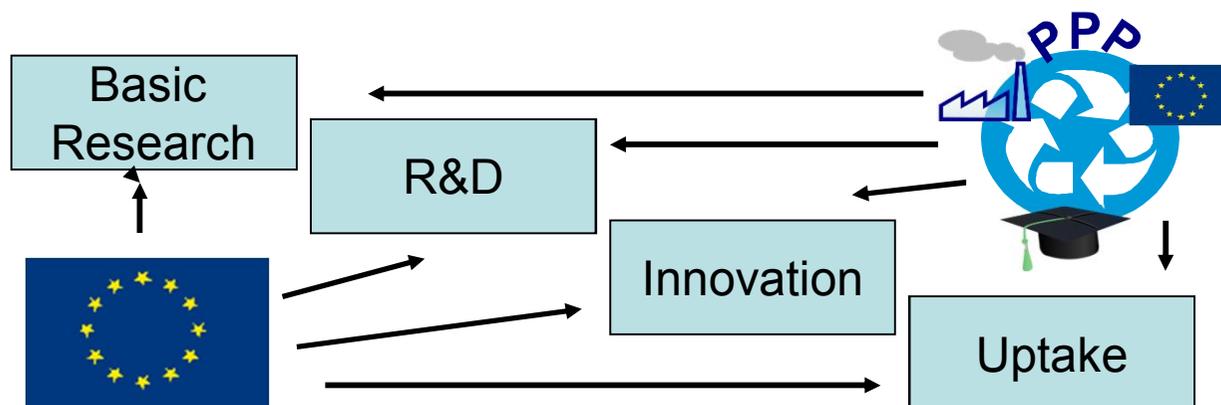
STANDARDISATION
REGULATION/ LEGAL ISSUES /POLICY

COMPETITIONS

ETHICAL & SOCIETAL ISSUES

CROSS-BORDER MOBILITY OF RESEARCHERS

INTERNATIONAL COOPERATION

ANSWERS TO YOUR QUESTIONS

What are you looking for?

- **STRONGER INDUSTRY PARTICIPATION**

    3 ROLES:

    - Involve their R&D departments

    - Provide validation scenarios

    - Provide platforms

    -> DEMONSTRATED **COMMITMENT** TO THE PROJECTS AND GENUINE **INTEREST** IN THE PROJECT **OUTCOME**

    EXPECTED IN:

    - Objective 2.1) S&T

    - Objective 2.2) Pilots

    - Objectove 2.2) Accompanying measures

- **STRENGTHEN SCIENTIFIC EXCELLENCE: R&D – Obj 2.1)**
- **INCREASED VISIBILITY OF EUROPEAN ROBOTICS**

What are you looking for?
AT PROJECT LEVEL - R&D projects

- *Clear Objectives: right balance ambitious/realistic*

- *Contribution: position wrt SoA (literature/funded projects)*

- *HOW: methodology*

- *Validation in real-world scenarios*
  - *Testing/Validation*
  - *Illustrate capabilities of system*
  - *Open to any application area*

- *Define success criteria:*
  - *Milestones/Metrics/Expected functionalities and capabilities*

What you do NOT want?

- *Pure theoretical projects with only simulation/lab tests*

- *Pure application/product development*

- *Double funding -> Same topic can be addressed by several projects but each has to justify its specificity/contribution*

- *Large effort on literature survey -> bring the right expertise on board*

- *Re-submission from other challenges artificially re-shaped for this challenge*

- ***Any ARTIFICIAL ADD-ON** - examples*
  - *Industry with no clear role / added value or no clear commitment to the project*
  - *"Good geographical coverage"*
  - *Huge un-manageable – inefficient IPs with large number of partners*
  - *Consultant for administration/finance (unless proven the most cost efficient solution)*

Who are the leading players?

CATEGORIES OF ACTORS

- *Large Robotics manufacturers*
- *Component providers /* User industry
- *SMEs (manufacturers, components/users)*
- *Excellent academic research*
- *Research Labs/Institutes*

BUT WE WANT NEWCOMERS (e.g.: application domains not yet covered, more professional service robotics (DDD*), more USERS, more multidisciplinary efforts,…)

DDD*: Dangerous - Dull - Dirty

●●● 23

Is this new or has it been called before?

- *Challenge 2 called before BUT*
  - *New –*
    - *Smart spaces*
    - *Symbiotic human-machine interaction*
    - *Use-Cases in robotics -> MOBILISE NEW COMMUNITIES (system integrators, users, end-users…)*
    - *Prepare H2020 – Networking - Outreach*

Is there a key group of actors or ETP driving this?

- **EUROP** *the European Robotics Technology Platform* *http://www.robotics-platform.eu/*
  - *SRA (Strategic Research Agenda for Robotics in Europe)*
- **EURON** *"EUropean RObotics research Network".*   *http://www.euron.org/*
  - *Network formerly funded by EC – now self-sustaining*
  - *more than 230 academic and industrial groups in Europe*
  - *common interest in advanced research and development to make better robots.*
- **euRobotics** *the European Robotics Coordination Action - http://www.eurobotics-project.eu/cms/index.php*
  - *improvement of cooperation: industry - academia*
  - *enhancement of public perception of (European) robotics.*
- **EUCogIII** *- European Network for the Advancement of Artificial Cognitive Systems, Interaction and Robotics - http://www.eucognition.org/*
  - *792 members*
  - *network for researchers in artificial cognitive systems and related areas who want to connect to other researchers and reflect on the challenges and aims of the discipline.*

Are there any additional background document?

- *Call10 web-page: COMING SOON – check*
  http://cordis.europa.eu/fp7/ict/cognition/

  - *Pre-proposal check service*

  - *Presentations given at the infoday*

  ☞ *FAQ document!!!:*

  - *Summary of funded projects - the results of previous Calls*

  - *See also our projects portfolio:*
    http://cordis.europa.eu/fp7/ict/cognition/projects/areas-projects_en.html

●●● 26

ANY FURTHER HELP? Contact us

CALL 10 Challenge 2 Contact:
http://cordis.europa.eu/fp7/ict/cognition/

*Contact person: **Cécile Huet***

✉ *INFSO-CHALLENGE-2-1@ec.europa.eu*

☎ *+352-4301-36088*