



This project has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 662287.



# EJP-CONCERT

**European Joint Programme for the Integration of Radiation Protection Research**

**H2020 – 662287**

## D2.12 - Revised Strategic Research Agenda for Social Sciences and Humanities in radiation protection

**Lead Author: Tanja Perko, SCK-CEN**

**With contributions from the Task 2.6 working group:** Catrinel Turcanu, Michiel Van Oudheusden, Gaston Meskens SCK•CEN; Christiane Pözl-Viol, BfS; Caroline Schieber, Thierry Schneider, CEPN; Eloise Lucotte, Ilma-Choffel de Witte, Genevieve Baumont, IRSN; Stéphane Baudé, MUTADIS; Ivica Prlic, M. Suric Mihic, IMROH; Tatiana Duranova, VUJE; Deborah Oughton, Yevgeniya Tomkiv, NMBU; Marie Claire Cantone, UMIL; Eva Salminen, STUK; Sotiris Economides, EEAE; L. Skuterud, NRPA and Friedo Zölzer, USB

**Reviewer: Sisko Salomaa, UEF, WP2 Leader and CONCERT coordination team**

Work package / Task	WP2	Task 2.6
Deliverable nature:	<b>Report</b>	
Dissemination level: (Confidentiality)	<b>Public</b>	
Contractual delivery date:	<b>M36 (postponement: end M37)</b>	
Actual delivery date:	<b>M38</b>	
Version:	<b>1</b>	
Total number of pages:	<b>17</b>	
Keywords:	<b>ethics, social sciences and humanities, risk perception, risk communication, safety culture</b>	
Approved by the coordinator:	<b>M38</b>	
Submitted to EC by the coordinator:	<b>M38</b>	

**Disclaimer:**

The information and views set out in this report are those of the author(s). The European Commission may not be held responsible for the use that may be made of the information contained therein.

## Executive Summary

This document describes the research priorities and the Strategic Research Agenda (SRA) for Social Sciences and Humanities (SSH) in radiation protection for the next 20 years. It also reports on the results of a first gap analysis.

The SSH SRA is a living document, under constant development through the engagement of the SSH community in radiation protection field and other stakeholders, especially technical and research platforms. To this end, the SSH community in radiation protection field will structure and enhance dialogue at the European level among the different stakeholders, fostering the sharing of knowledge and information among various disciplines working on aspects of radiation protection and identify the SSH research needs in the field of radiation protection. The objective of Strategic Research Agenda (SRA) for Social Sciences and Humanities (SSH) in radiation protection is to contribute towards improvement of the Radiation Protection (RP) system by coordinating European SSH research in the field of radiation protection; supporting education and training; knowledge management and sharing; and identifying SSH state of the art across domains. It is only by enabling SSH research to play a fuller and stronger role through a coordinated SRA mechanism that societal perspectives on research relating to radiation protection will be realised.

The SSH SRA has been developed through a broad stakeholder engagement process. The research topics to be included in the SSH SRA have been collected through various activities carried out in the H2020 projects CONCERT and the FP7 projects OPERRA, PREPARE and EAGLE, notably the RICOMET 2015, 2016 and RICOMET 2017 conferences and Symposium on Ethics of Environmental Health, as well as in dialogues with members of the radiation protection platforms, carried out in a context of the CONCERT 2.6 task group. These research topics have been prioritised for the first time at the Radiation Protection Week in Oxford (19-23 September 2016) with task 2.6 members, SSH community and platforms, and further debated upon at the RICOMET Conference 2017 (June 27th to 29th, Vienna) with a large audience. The version summarised in this report is the most recent revision on of the SSH SRA (D2.8 and D2.10).

Towards the end of 2017, first steps to build a joint roadmap for radiation protection research have been taken (CONCERT D3.4). With this occasion, a specific challenge for SSH was identified and integrated into the draft Joint Roadmap for Radiation Protection Research; this challenge was defined as “Enhancing integration of radiation protection science with society”.

The SRA for Social Sciences and Humanities Research in radiation protection is currently structured in six research lines addressing broader societal challenges related to Health and wellbeing, Secure, safe and resilient societies, Communication, collaboration and citizenship and Integration, impact and reflexivity:

- Effects of social, psychological and economic aspects on radiation protection behaviours and choices of different actors;
- Holistic approaches to governance of radiological risks;
- Guiding principles for Responsible Research and Innovation in Radiation Protection;
- Stakeholder engagement and participatory process in radiation protection research; development, policy and practice as well as their role in decision making;
- Risk communication;
- Radiation protection culture.

Each of these research lines includes a number of specific research topics relevant to a future European research agenda in the field of radiation protection. The SSH strategic research agenda will support identifying the priorities for future European SSH research in the field of radiation protection.

A first gap analysis of SSH research has been carried out in February 2018 by the task 2.6 members in order to define a list of priorities for Social Science and Humanities research to be addressed by projects responding to the NFRP 2018 calls. This analysis was based on: SSH SRA (CONCERT Deliverable 2.8), priority topics identified through a broad stakeholder consultation (CONCERT Deliverable 2.6), and the analysis of current, on-going projects, and recently finalized projects in the radiation protection field: PREPARE, NERIS-TP, CONFIDENCE, TERRITORIES, ENGAGE, EU project on the implementation of revised BSS and Nuclear Safety Directive on public information and transparency in a radiological emergency, SHAMISEN, SHAMISEN-SINGS, PREPARE, CONCERT, NFRP 9.

The SSH research priorities identified through the gap analysis are the following:

- Risk communication about radioactivity and RP principles in medical applications of ionizing radiation; impact of communication on RP behaviours of practitioners.
- Risk communication about low doses and related uncertainties.
- Ethical basis and values underpinning risk communication about exposures to ionizing radiation.
- The understanding of ionizing radiation concepts, risks and uncertainty by different stakeholders in the context of medical exposures, industrial applications and natural radiation.
- The interplay of psychological aspects associated with radioactivity, social environment and radiation protection behaviours.
- Potential and pitfalls of citizen involvement in knowledge production for radiological risk governance.
- Socio-economic valuation and multi-criteria decision aid methods to formally structure the evaluation and integration of radiological and non-radiological factors.
- Enhancing the reflexive awareness of actors involved in radiation protection R&D about the societal implications of research.
- Democratic culture in RP in order to construct joint actions with institutional and non-institutional actors.
- Mediation, facilitation and representation on the triangle scientists, public and other stakeholders for different exposure situations.
- Collaborative framework for stakeholder engagement in RP research, policy and practice in ways that enhance responsiveness to societal needs and concerns.
- Societal needs for and evaluation of legal instruments and governance frameworks supporting access to information, public participation and access to justice in relation with RP issues.
- Stakeholder and public participation tools and methodologies for different radiological exposure situations. Roles and rules of stakeholders in the engagement process. Motivational factors, ethics, and link between theory and practice.
- Characterization of RP culture.
- The role of RP culture in the implementation and improvement of the protection system.

Apart from addressing one or more of the research activities listed above, the SSH community encourages multi-disciplinary approaches attending also to social and ethical considerations.

## Table of Contents

I.	Introduction .....	6
II.	Working Method .....	7
III.	Strategic Research Agenda (SRA) for Social Sciences and Humanities (SSH) in radiation protection field (RP) .....	8
	Research line 1: Effects of social, psychological and economic aspects on radiation protection behaviour and choices of different actors .....	9
	Research line 2: Holistic approaches to governance of radiological risks.....	10
	Research line 3: Guiding principles for Responsible Research and Innovation in Radiation Protection .....	11
	Research line 4: Stakeholder engagement in radiation protection research, development, policy and practice.....	12
	Research line 5: Risk communication .....	13
	Research line 6: Radiation protection culture.....	14
IV.	Gap analysis for research priorities.....	15

## I. Introduction

An important achievement in the development of European strategies and roadmaps for future radiation protection research has been the creation of a first Strategic Research Agenda (SRA) for Social Sciences and Humanities (SSH) in radiation protection (RP), thus enabling the integration of RP science in the societal context. The SSH strategic research agenda aligns with recent proposals for more open and responsive modes of research and science policy-making, and attends to the challenges put forward in contemporary EU-wide policy discourses on “Science with and for society” and “Responsible Research and Innovation”. Recognizing the intertwined character of social and technical resonates with the idea that science and technology are open to individual creativity, collective ingenuity, economic priorities, cultural values, institutional interests, stakeholder negotiation, and the exercise of power. It is thus important to reflect on how this shapes the organisation of radiation protection research and the formulation of its policies.

The objective of the Strategic Research Agenda for Social Sciences and Humanities in radiation protection is to contribute towards improvement of the radiation protection system by coordinating European research in the field of SSH in radiation protection; supporting education and training; knowledge management and sharing; and identifying SSH state of the art across domains. It is only by enabling SSH research to play a fuller and stronger role through a coordinated SRA mechanism that societal perspectives on research relating to radiation protection will be realised.

The underlying principles of the SSH SRA are that:

- SSH can support existing and future research, policy and practice, in all areas relating to radiation protection to take into account better the concerns, values and needs of a wider range of stakeholders, including citizens and communities;
- the social sciences and humanities (SSH) research should be co-ordinated, shared and integrated in European research and development on radiation protection; for this, also collaboration with the European radiation protection associations will be an integral component;
- the research relating to radiation protection should be conceived as transdisciplinary and inclusive, integrating citizen, science and stakeholder input from the start.

With these principles in mind, the SSH strategic research agenda will support identifying the priorities for future European SSH research in the field of radiation protection.

Creating and updating the SRA for Social Sciences and Humanities is an ongoing and constantly developing process, and the output will be regularly adapted according to societal needs. This will be done by a continuous engagement of the SSH community in radiation protection field and other stakeholders, especially technical and research platforms.

## II. Working Method

The research topics to be included in the SSH SRA have been collected through various activities carried out in the H2020 projects CONCERT and the FP7 projects OPERRA, PREPARE and EAGLE (notably the RICOMET 2015, 2016 and RICOMET 2017 conferences and Symposium on Ethics of Environmental Health), as well as in dialogues with members of the radiation protection platforms, carried out in a context of the CONCERT 2.6 task group. The collection of the research topics was discussed at the Radiation Protection Week in Oxford (19-23 September 2016) with task 2.6 members, SSH community and platforms, and the most urgent topic for an SSH research was identified (CONCERT Deliverable 2.2, 2015).

The final prioritisation for the 2<sup>nd</sup> CONCERT call was done by the following active discussions at the task 2.6 meeting in Oxford (CONCERT Deliverable 2.8, 2017). Moreover, 1400 individuals from radiation protection field have been asked to contribute to the further development of research and priorities in Social Sciences and Humanities in June 2017. The e-mail addresses from the OPERRA questionnaire and the EAGLE and PLATENSO projects have been used for this purpose. Respondents were asked to share their opinion, remarks or give advice on the current version of the SRA for Social Sciences and Humanities. In addition, the Strategic Research Agenda (SRA) for Social Sciences and Humanities (SSH), developed based on a broad stakeholder engagement process, has been part of the debate at the RICOMET 2017 Conference (27-29 June 2017, Vienna). The conference has been attended by 130 delegates and has been live streamed from the IAEA venue on the RICOMET Facebook Group.

Towards the end of 2017, first steps to build a joint roadmap for radiation protection research have been taken (CONCERT D3.4). With this occasion, a specific challenge for SSH was identified and integrated into the draft Joint Roadmap for Radiation Protection Research; this challenge was defined as “Enhancing integration of radiation protection science with society” (CONCERT Deliverable 2.10).

Additionally, a gap analysis has been carried out by task 2.6 researchers in order to identify SSH research priorities to be addressed by projects responding to the NFRP 2018 calls. These topics are included in the SSH SRA (CONCERT 2.8) and/or defined as priorities by radiation protection stakeholders (CONCERT 2.6), but are not addressed, or addressed only to a limited extent in the recent or ongoing projects or research calls (CONFIDENCE, TERRITORIES, SHAMISEN, SHAMISEN-SINGS, ENGAGE, PREPARE, CONCERT, NFRP-9, EU project on implementation of revised BSS and Nuclear Safety Directive on public information and transparency in a radiological emergency). The gap analysis has been presented at the CONCERT information day in February 2018, in Munich.

In March 26 2018, the SSH SRA was presented at the Society for Risk Analysis Conference – Benelux Chapter to a broad audience including SSH researchers in risk analysis and Science and Technology Studies, and nuclear science researchers.

### III. Strategic Research Agenda (SRA) for Social Sciences and Humanities (SSH) in radiation protection field (RP)

The SSH strategic research agenda aligns with recent proposals for more open and responsive modes of research and science policy-making, and attends to the following challenges put forward in contemporary EU-wide policy discourses on “Science with and for society” and “responsible research and innovation”: Health and wellbeing, Secure, safe and resilient societies, Communication, collaboration and citizenship and, Integration, impact and reflexivity.

Health and wellbeing comprises the social, mental and physical health of individuals as well as social factors such as the strength and diversity of social bond within a community and its capacity of autonomy. Achieving health and wellbeing requires investments on behalf of decision makers and research communities at a time of economic restraint and the aging of populations across Europe. Research in the field of SSH explicitly addresses these aspects and draws connections between health and wellbeing to ensure quality of life for all.

European nations face major natural hazards and human-induced threats. SSH research seeks to make significant contributions towards enhancing societal resilience and preparedness in the face of these threats by examining contemporary approaches to safety and security, and by opening a broader societal debate on the kinds of resilience that can, and should, be achieved.

SSH research on communication, collaboration and citizenship advances our understanding of how individuals and people are included and excluded, and how processes like communication and collaboration foster novel forms of identity, sense making and belonging. It does so with the aim of creating societies in which citizens thrive and feel confident to express themselves.

SSH research on integration, impact and reflexivity assesses the impact of research activities on the values and choices made by researchers in their communities. This includes giving due consideration to the societal and ethical implications of research agendas, processes, and outputs.

The SRA for Social Sciences and Humanities Research in radiation protection is structured in six research lines addressing either transversal issues relevant for all radiation protection platforms (MELODI, ALLIANCE, NERIS, EURADOS and EURAMED), or topics of interest for one particular RP area (e.g. there is a stronger relation to NERIS challenges and key topics). The SSH strategic research agenda is however a “self-standing” SRA and, although it has common points, it is not included as such in other platforms’ SRAs.

The SSH research lines reflect areas for which the need for a joint European effort has been identified as a prerequisite to addressing the contemporary societal challenges outlined above. Each of these research lines includes a number of specific research topics relevant to the future European research agenda in the field of radiation protection. Exchanging views on these joint challenges will be part of the further procedure to improve the SRA, set priorities and formulate projects.

## Research line 1: Effects of social, psychological and economic aspects on radiation protection behaviour and choices of different actors

Research line 1 seeks to improve the understanding of behavioural aspects related to radiological risks, including the interrelation between behaviour, perception of radiological risks, economic aspects, knowledge, culture, historical memory and other potentially influencing factors.

### Relevant topics include:

<b>Topics RL1</b>
<p>1.1 Links between perception of radiological risk and radiation protection behaviour, or individual strategies to cope with perceived risk in relation to radiation exposure, using both cross-sectional and longitudinal studies focusing on one or more of these aspects:</p> <ul style="list-style-type: none"> <li>• different exposure contexts (workers, population living in areas affected by radiological contaminations),</li> <li>• different time scales (e.g. different generations),</li> <li>• cultural context,</li> <li>• socio-economic issues of behaviour change</li> </ul>
<p>1.2 Comprehensive approaches to studying the perception of radiological risk and environmental remediation actions in post-accident and existing exposure situations.</p>
<p>1.3 Social and traditional media impact on perception of radiological risk and general well-being linked to radiation exposures. This includes the influence of citizen journalism on radiation protection behaviour in different exposure situations and developing models for integrating scientific journalism in radiation protection.</p>
<p>1.4 The interplay of individual differences and psychological aspects associated with radioactivity, social environment and radiation protection behaviours.</p>
<p>1.5 The understanding of ionizing radiation concepts, risks and uncertainty by different stakeholders (e.g. practitioners, patients, local population) and the respective amplifier effects. Contexts are medical exposures, industrial applications and natural radiation. T</p>
<p>1.6 Perception of radiological risks from low doses of radiation, accounting for cultural differences in routine, emergency and other exposure situations.</p>
<p>1.7 Socio-psychological and economic aspects of medical follow-up after accidental or other exposures.</p>

## Research line 2: Holistic approaches to governance of radiological risks

Research line 2 develops holistic and inclusive approaches for the governance of radiological risk situations by integrating technical assessments and social concern assessments (ethical, socio-economic, psychological and cultural aspects, governance issues, articulation of roles and contributions of different stakeholders including local actors and civil society, role of local and citizen knowledge...), raising awareness about the social scientific aspects and integrating them into knowledge building, framing of issues and the decision-making process together with technical assessments. Evaluation of radiological and non-radiological (i.e. social) aspects will serve as input for decision-making by the various stakeholders. This includes institutions, but also actors without defined institutional role but having to take decisions vis-à-vis their own processes, professional practices, or ways of life.

### Relevant topics include:

<b>Topics RL2</b>
2.1 Assessing values and expectations underlying ‘integration approaches,’ and the choices made in the name of SSH integration. This includes assessment of the limitations of risk governance as it is conceived of today, e.g. by examining which knowledge, approaches, frameworks cannot be transferred from one field to another.
2.2 Assessment of the synergetic effects (radiological and non-radiological) of radiation accidents (e.g. medical) through transdisciplinary research, and development of policy appraisal tools to inform decision-making.
2.3 Holistic approaches to accident preparedness, management and recovery, taking into account multiple risks, social, economic and psychological factors. These c approaches should account for development of psychological support for evacuees as part of preparedness policies; socio-economic aspects of preventive distribution of iodine tablets in different EU countries; and psychological consequences of emergency management decisions.
2.4 Social and psychological issues related to preparedness and response to nuclear and radiological terrorism and other delinquent behaviour.
2.5 Ethical aspects of crisis situations, particularly ethical questions of evacuation, and post-accident management (“emergency ethics” vs. “normal ethics”), and the transition from emergency to existing radiation exposure situations.
2.6 Development of socio-economic valuation and multi-criteria decision aid methods to formally structure the evaluation and integration of radiological and non-radiological factors for different ionising radiation exposure situations
2.7 Decision making mechanisms in post-accident situations, with emphasis on local knowledge and decision-making.
2.8 Policy analysis of how the Aarhus convention and other reference documents are mobilised in the radiation protection field and to which impact.
2.9 Democratic culture in radiation protection in order to construct joint actions with institutional and non-institutional actors.
2.10 Comparison of medical guidelines and principles of radiation protection with a view on the underlying ethical values.
2.11 Investigation of approaches to uncertainty in different professions (e.g. general practitioners, surgeon, food scientist, environmental scientist, public).
2.12 Ethical perspective of compensation for damage incurred due to various situations of radiation exposure and differences among countries.

## Research line 3: Guiding principles for Responsible Research and Innovation in Radiation Protection

Research line 3 aims at assessing how radiological protection research and development (R&D) is conducted, with the aim of inciting more socially responsive and ethically sound R&D and outcomes. This should enhance the impact of social science and humanities research on science and technology policy and research agendas in the field of radiation protection. The design of transdisciplinary discourses is an emphasis in this research line, for example through co-creative agenda setting processes between scientists and the public.

### Relevant topics include:

<b>Topics RL3</b>
3.1 Enhancing the reflexive awareness of actors involved in R&D about the societal implications of nuclear technology applications and radiation exposure situations that require radiation protection research.
3.2 Examining the social, cultural, and historical context of radiation protection research; the rationales, possibilities, and limitations of research approaches and methods; the social relevance of research hypotheses.
3.3 Ascertaining conflicts of interest in radiation protection research and finding ways to remedy such conflicts.
3.4 Identifying and developing sound ethical principles and approaches (e.g. deliberation) to guide radiation protection research in a socially responsive and responsible manner.
3.5 Operationalizing, as well as problematizing and developing, principles like trans-disciplinarity and holism, which sustain the integration of SSH into radiation protection research.
3.6 Evaluating the institutional uptake of research projects and findings.
3.7 Making the SSH integration meaningful and operational
3.8 Developing methodologies and tools for the dynamic mapping of stakeholders' concerns, views and needs to identify R&D priorities in the radiation protection field

## Research line 4: Stakeholder engagement in radiation protection research, development, policy and practice

Research line 4 aims at fostering stakeholder engagement in radiation protection research, policy and practice in ways that enhance responsiveness to societal needs and concerns. By stakeholder we denote anyone who has a stake in radiation protection research, its development or applications and/or is potentially affected by radiation protection R&D and the outcomes it generates.

### Relevant topics include:

<b>Topics RL4</b>
4.1 Mediation, facilitation and representation on the triangle scientists, public and other stakeholders (e.g. industry, elite, policy makers) for different exposure situations and nuclear applications, research and development, including lessons from Fukushima.
4.2 Establishment of a collaborative framework for stakeholder engagement (radiation protection experts, radiation protection policy makers, authorities of different governmental levels, disaster management organisations and civil society organisations) in radiation protection research, policy and practice in ways that enhance responsiveness to societal needs and concerns. Particular focus on low radiation doses and related uncertainties.
4.3 Analysis of societal needs for and evaluation of legal instruments and governance frameworks supporting access to information, public participation and access to justice in relation with RP issues.
4.4 Examination, assessment and design of stakeholder and public participation tools and methodologies for different radiological exposure situations. Roles and rules of stakeholders in the engagement process. Motivational factors, ethics, and link between theory and practice.
4.5 Potential and pitfalls of citizen involvement in knowledge production for radiological risk governance.
4.6 Preservation of knowledge and experience of local stakeholders' (e.g. local community, schools, citizens) involvement and participation. Community research and tracing for development of participation culture in relation to different exposure situations

## Research line 5: Risk communication

Research line 5 aims at developing research to support communication about ionising radiation between different stakeholders and citizen-centred risk communication, in order to clarify choices and options in a variety of exposure situations and empower citizens and other stakeholders to make informed decisions.

### Relevant topics include:

<b>Topics RL5</b>
5.1 Risk communication about radioactivity and radiation protection principles in medical applications of ionizing radiation and the impact of communication on radiation protection behaviour of practitioners.
5.2 Improving decision-making through informed consent of patients for medical procedures involving ionising radiation; by empowering patients in decision making; ethical issues and communication about uncertainties.
5.3 Developing long term communication models to improve radiation protection culture and public well-being in long term exposure situations.
5.4 Use and perception of technical information and risk estimates in communication with various publics (lay people, experts, informed civil society).
5.5 Media communication about ionizing radiation, in particular low radiation doses and related uncertainties in the field of radiological protection including inter-media agenda setting in different exposure situations.
5.6 Ethical basis and values underpinning risk communication about ionizing radiation exposures,
5.7 Risk communication and stakeholder involvement in post-accident recovery in order support decision making process related to daily life and to improve public health.
5.8 Developing risk communication about low doses: Use of state of the art knowledge from mental models and other socio-psychological research with focus on low doses of ionizing radiation and related uncertainties.
5.9 Ethical principles guiding deliberative processes on questions that cannot be decided by radiation specialist alone: role of uninformed risk perceptions, applicability of informed consent, appropriateness of risk comparisons, dealing with refusal to communicate.

## Research line 6: Radiation protection culture

Research line 6 supports the development and building of a radiation protection culture among stakeholders in various exposure situations (planned, existing and emergency) and categories of exposure (occupational, patient, general public). This should:

- favour the understanding of radiation protection norms and standards;
- favour better decision-making processes concerning the management of radiation exposure situations, and identification and implementation RP actions;
- enable individuals, where relevant: to reflect on their own protection and/or that of other individuals; to consider consciously radiation protection aspects in their activities or decisions; to make their own decision with regard to their own protection against ionising radiations; to participate to decision making processes related to the management of exposure situations;
- enable professionals in RP field and other stakeholders to dialogue and share a common language, in a view to enhance the efficiency and reliability of the radiation protection system and its capacity to effectively answer the concerns of all concerned stakeholders.

### Relevant topics include:

<b>Topics RL6</b>
<p>6.1 Characterization of RP culture, including</p> <ul style="list-style-type: none"> <li>• Specificities associated with exposure situations;</li> <li>• Organisational/societal/political/economic/ psychological aspects and value judgments influencing RP culture or RP behaviours;</li> <li>• Cultural differences between countries;</li> <li>• Ethical frameworks underlying RP cultures;</li> <li>• Links between RP culture at the level of an organisation/ community and the level of groups or individuals from this organisation/community;</li> <li>• Impact of evolving RP technologies, knowledge or communication technologies on RP culture</li> <li>• Relationships between RP culture and safety culture (notably in the nuclear industry).</li> </ul>
<p>6.2 Criteria /methodologies / tools for the qualitative and quantitative evaluation of the level RP culture, at group and /or individual level</p>
<p>6.3 The role of RP culture, in particular</p> <ul style="list-style-type: none"> <li>• Contribution of RP culture in the implementation and improvement of the protection “system”;</li> <li>• How RP culture can improve health and well-being of populations?</li> <li>• Practical achievements from developing / building RP culture (impact on level of exposure, protective actions, decision making processes,...)</li> </ul>
<p>6.4 Development of tools, methods, processes to build, maintain and transmit RP culture</p> <ul style="list-style-type: none"> <li>• Needs and concerns of stakeholders regarding RP culture, with attention to the development of participatory tools and low dose exposure situations.</li> <li>• Development of tools / methods / processes to enhance RP culture in specific fields: emergency and late phase nuclear accident preparedness, NORM activities, Radon exposure, paediatric imaging</li> <li>• Processes to maintain/ transfer RP culture through generations;</li> <li>• Guidance for enhancing RP culture for specific publics (communities around nuclear installations, schools, patients, pregnant women, medical doctors);</li> </ul>
<p>6.5 Social, psychological and economic aspects of radiological protection choices by different actors.</p>

## IV. Gap analysis for research priorities

### **GAP ANALYSIS FOR SOCIAL SCIENCES AND HUMANITIES RESEARCH**

**by CONCERT task 2.6 members**

*Version 16/02/2018*

Social and ethical aspects in radiation protection research, policy and practice comprise a transversal topic that needs to be addressed across numerous fields related to ionizing radiation and its applications: medical exposures to ionizing radiation, naturally occurring radioactive materials, nuclear waste management, environmental remediation, emergency management, and decommissioning.

The following list of priorities for Social Science and Humanities research to be addressed by projects responding to the NFRP 2018 calls was derived by CONCERT Task 2.6 members based on:

- Strategic Research Agenda for Social Sciences and Humanities in radiation protection (see CONCERT Deliverable 2.8),
- priority topics identified through a broad stakeholder consultation (see CONCERT Deliverable 2.6),
- and analysis of current, on-going projects, and recently finalized projects in the radiation protection field (PREPARE, NERIS-TP, CONFIDENCE, TERRITORIES, ENGAGE, BSS public information & transparency in a radiological emergency, SHAMISEN, SHAMISEN-SINGS, PREPARE, CONCERT, (upcoming) NFRP 9.

Apart from addressing one or more of the research activities listed below, the SSH community encourages multi-disciplinary approaches attending also for social and ethical considerations.

#### ***Proposal for research activities based on the SSH SRA and the GAP analysis***

SSH 5.1 Risk communication about radioactivity and radiation protection principles in medical applications of ionizing radiation and the impact of communication on radiation protection behaviour of practitioners.

→ not addressed

SSH 5.8 Developing risk communication about low doses: Use of state of the art knowledge from mental models and other socio-psychological research with focus on low doses of ionizing radiation and related uncertainties.

→ addressed to only a limited extent for emergency situations (CONFIDENCE )

SSH 5.6 Ethical basis and values underpinning risk communication about ionizing radiation exposures  
→ addressed to a very limited extent for post-emergency situations (medical & health surveillance and evacuation decision making in SHAMISEN; citizen science in SHAMISEN SINGS)

6.1 Characterization of radiation protection culture

→ addressed only to a very limited extent (links between radiation protection culture and radiation protection behaviours) in the ENGAGE project (medical exposures, indoor radon, emergency situations)

SSH 1.5 The understanding of ionizing radiation concepts, risks and uncertainty by different stakeholders (e.g. practitioners, patients, local population), in the context of medical exposures, industrial applications and natural radiation. This includes amplifier effects of practitioner's knowledge

→ only partially addressed in a systematic way, at a very general level in the CONCERT questionnaire and few knowledge items in two country surveys for the CONFIDENCE project.

SSH 3.1 Enhancing the reflexive awareness of actors involved in R&D about the societal implications of nuclear technology applications and radiation exposure situations that require radiation protection research.

→ addressed to a very limited extent through lab ethnography studies in TERRITORIES (long-term exposure situations only); addressed to very limited extent for post-emergency situations in SHAMISEN and investigated in SHAMISEN-SINGS in terms of lessons learnt after Chernobyl & Fukushima.

SSH 4.1 Mediation, facilitation and representation on the triangle scientists, public and other stakeholders (e.g. industry, elite, policy makers) for different exposure situations and nuclear applications, research and development, including lessons from Fukushima.

→ rationales and frameworks for stakeholder engagement addressed in ENGAGE (medical exposures, indoor radon, emergency) and SHAMISEN SINGS (emergency situations); also addressed to a limited extent in SHAMISEN (stakeholder engagement in medical health surveillance), NERIS-TP and PREPARE (stakeholder engagement activities related to emergency situations).

SSH 1.4 The interplay of psychological aspects associated with radioactivity, social environment and radiation protection behaviours.

→ partially addressed in CONFIDENCE and PREPARE (emergency situations) and TERRITORIES (NORM and post-accident)

SSH 4.5 Potential and pitfalls of citizen involvement in knowledge production for radiological risk governance.

→ addressed to a limited extent in SHAMISEN-SINGS and CONFIDENCE, related to post-emergency situations.

SSH 2.6 Development of socio-economic valuation and multi-criteria decision aid methods to formally structure the evaluation and integration of radiological and non-radiological factors for different ionising radiation exposure situations.

→ partially addressed in CONFIDENCE (MCDA for emergency situations) and TERRITORIES (long-term exposure situations)

SSH 2.9 Democratic culture in radiation protection in order to construct joint actions with institutional and non-institutional actors.

→ partially addressed in PREPARE for post-emergency situations

SSH 4.2 Establishment of a collaborative framework for stakeholder engagement (radiation protection experts, radiation protection policy makers, authorities and civil society organisations) in radiation protection research, policy and practice in ways that enhance responsiveness to societal needs and concerns. Particular focus on low radiation doses and related uncertainties.

→ partially addressed in ENGAGE as guidance for stakeholder engagement in practice for indoor radon, medical exposures and emergency situations

SSH 4.3 Analysis of societal needs for and evaluation of legal instruments and governance frameworks supporting access to information, public participation and access to justice in relation with radiation protection issues.

→ addressed in ENGAGE as rationales and frameworks for stakeholder engagement for indoor radon, medical exposures and emergency situations; and in the BSS project as implementation of legal instruments for public information and transparency for emergency situations

SSH 4.4 Examination, assessment and design of stakeholder and public participation tools and methodologies for different radiological exposure situations. Roles and rules of stakeholders in the engagement process. Motivational factors, ethics, and link between theory and practice.

→ addressed in ENGAGE as rationales and frameworks for stakeholder engagement for indoor radon, medical exposures and emergency situations

SSH 6.3 The role of RP culture, in particular the contribution of RP culture in the implementation and improvement of the protection “system”; practical achievements from developing / building a radiation protection culture (impact on level of exposure, protective actions, decision making processes,...)

→ addressed in ENGAGE as role of radiation protection culture in supporting stakeholder engagement and governance of radiological risk for medical, emergency and indoor radon exposures