EUROPEAN UNION

EUROPEAN RESEARCH AREA AND INNOVATION COMMITTEE
Strategic Forum for International S&T Cooperation

Secretariat

Brussels, 21 September 2020
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ERAC-SFIC 1357/20

NOTE

From:	SFIC Secretariat
To:	Delegations
Subject:	SFIC Task Force on Science diplomacy working paper "Anchoring science diplomacy in Horizon Europe developing specific subjects and activities"

Delegations will find attached the SFIC Working Paper on "Anchoring Science Diplomacy in Horizon Europe - developing specific subjects and activities", as adopted by the written procedure on 18th of September 2020.

SFIC TASK FORCE ON SCIENCE DIPLOMACY WORKING PAPER

"ANCHORING SCIENCE DIPLOMACY IN HORIZON EUROPE - DEVELOPING SPECIFIC SUBJECTS AND ACTIVITIES"

RATIONALE:

This document complements the information of the Strategic Forum for International S&T Cooperation (SFIC) input paper adopted on "Advancing the impact of Science Diplomacy at EU and Member States level through targeted support and improved coordination" which describes strategic activities to be considered with view to strengthening the anchoring and impact of Science Diplomacy (SD) within the European Research Area and Horizon Europe to (ERAC-SFIC 1352/20).

The aim of this paper revision is to support a brainstorming exercise for specifically developing Science Diplomacy aspects of Horizon Europe, acknowledging that Horizon Europe itself is a Science Diplomacy tool through offering an open, transparent and globally relevant programme, which benefits go beyond the EU.

These ideas should not be seen as detailed descriptions of call topics but as an illustration of topics currently discussed in the Science Diplomacy Community as well as in connection with the EU Commission priorities such as the Green Deal, Climate, Digitisation, Health and Security. Hence, the ideas here proposed should be seen as an inspiration on how to further strengthen the diffusion of Science Diplomacy approaches and impacts in Horizon Europe.

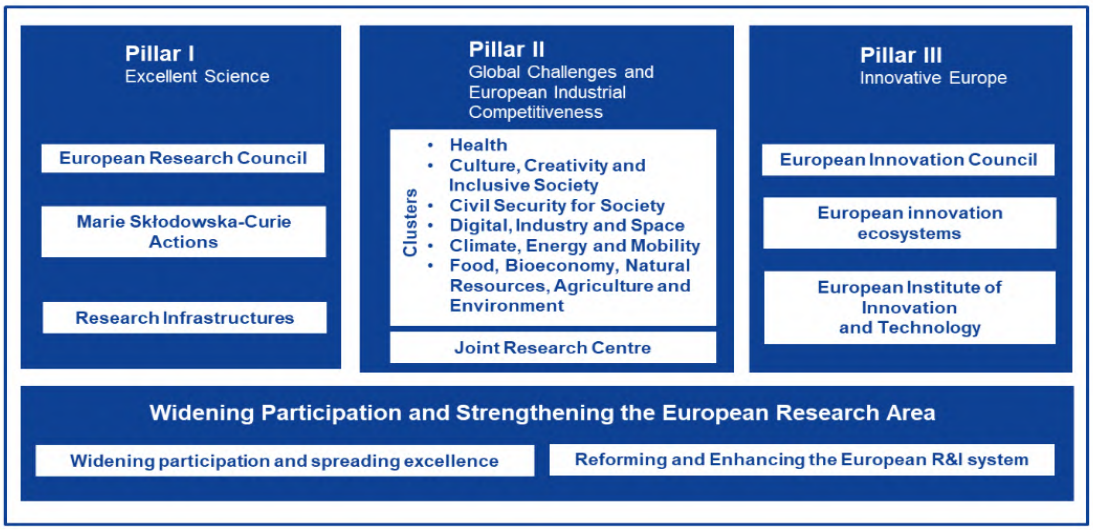
CONTEXT:

- At the time of this document being prepared, COVID-19 continues to spread rapidly worldwide. International collaboration, Science and diplomacy are fundamental more than ever to face the global pandemic and the current and future EU Framework Programmes for Research and Innovation (R&I) will have to address this and similar challenges in a global setting. Europe is on the right path and have achieved a lot over recent years, but major challenges remain. While on the one hand Europe works towards protecting its sovereignty and interests, it also has an important role in strengthening responsible global leadership, multilateralism and strategic cooperation with its neighbours and partners. The initial delay and hesitation, within and outside EU, in sharing and discussing information about the incoming pandemic, and the consequent development of the dialogue science-policy at national level, rather than systemically within the Union, has demonstrated the need of a robust communication among MS based on science and diplomacy, to enable open access to data, shared best practices and ultimately informed and timely political decisions.
- The ecological and digital transitions are going to be the essential components for the European Union recovery, together with cohesion policies and the common agricultural policy. This will need a coordinated effort based on public investment at European and national level and on mobilising private investment. Due to the high technological and scientific content that these measures and actions will have, scientific diplomacy will be key to make it possible. Therefore, Europe needs science, technology and innovation, that is, all the pillars of the HE, and because it is about collaborative and transnational processes and agreements, Scientific Diplomacy is going to play a crucial role. In the European Union, associations of academies and major learned societies have grown into important science advisors. In this sense, academies are vital hot spots in categories such as Scientific Advice / Scientific Evidence for Policy Making (see SAPEA, Science Advice for Policy by European Academies)
- The Partial General Approach on establishing the Specific Programme implementing Horizon Europe from April 2019 did contain specific provisions on Science Diplomacy within Cluster 2 under the developed "Broad lines" of the intervention area "Democracy and Governance", formulated as "The EU as an international and regional actor in multilateral governance, including new approaches to science diplomacy." The latest available version of the "Orientations towards the first Strategic Plan for Horizon Europe" (December 2019) does contain a general reference to Science Diplomacy in the description of the European Commission

priorities[1]. Cluster 2 aims to meet EU goals and priorities on enhancing democratic governance and citizens participation, at the same time, actions will help tackle social, economic and political inequalities, support human capital development and contribute to a comprehensive European strategy for inclusive growth. However, **there is no reference to Science Diplomacy in the entire description of the potential Cluster 2 "Key Research and Innovation Orientations"** anymore.

- It is **SFIC´s strong opinion that it is vital to integrate a strong Science Diplomacy component within Cluster 2** in order to:
  - advance this field from a conceptual point of view
  - increase the exchange of knowledge / best practises through networks of experts and practitioners
  - support the promotion of European values and principles
- In addition Cluster 5 contains a general reference to climate diplomacy and a specific reference to science diplomacy in the context of a partnership on "A climate neutral, sustainable and productive Blue Economy". Finally, Cluster 6 contains a reference to water and science diplomacy in the context of international cooperation activities.
- Therefore, **it is important to integrate,** as relevant, **Science Diplomacy topics and aspects in all Pillars and in Widening Participation and Strengthening the European Research Area of HE** to raise awareness among those expert communities and help to foster the development of sector-specific Science Diplomacy expertise.
- In addition to describing the issue at hand, every topic also includes a section "targets and relevance", pinpointing to the different elements that could be supported through addressing these topics. While the Framework Programme overall aims at European competitiveness and strengthening Europe´s position in the world, the Science Diplomacy related topics for example strive towards a Dialogue between scientists, diplomats and policy-makers, towards the Engagement of Civil Society in STI / Citizen Science or towards Scientific Advice / Scientific Evidence for Policy Making.
- The work of this paper has been a collaborative effort with Science Diplomacy experts engaged in different EU and international projects and activities and we would especially like to acknowledge the extensive contributions of the S4D4C (https://www.s4d4c.eu/) as well as INSSCIDE (https://www.insscide.eu/) projects and their coordinators Ms. Elke Dall and Ms. Claire Mays to this paper.

Currently proposed Pillar-structure of Horizon Europe[2]:



[1] 5) A stronger Europe in the world: "the growing role of science diplomacy as a key element of EU external action should also foster mutual understanding, stability and progress." Page 18

[2] "Orientations towards the first Strategic Plan for Horizon Europe", page 2
https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_orientations-he-strategic-plan_122019.pdf

COLLECTION AND DESCRIPTION OF DIFFERENT TOPICS:

Overarching tools:

- "**Science Diplomacy Booster**":

Science Diplomacy and science advice mechanisms should be fed by all relevant projects and initiatives of Horizon Europe – be it in the 'investigator-driven' / 'bottom-up' Horizon Europe schemes in Pillar 1 or the challenge-based activities in Pillar II and innovation activities of Pillar III or the Widening Participation and ERA related activities.

For those projects that have the potential to impact Science Diplomacy/Science Advice a dedicated "Booster of Science Diplomacy" could be developed. This booster is designed as a service (e.g. via supporting the development of training and networking activities as well as seminars or briefing material etc.) for those projects that would like to reach out to target groups from the policy-making and diplomatic sphere. This would allow insights from EU research to inform policy-making and hence, support evidence-based decision-making.

In principle, this booster can be applied to the whole Horizon Europe spectrum. However, to start the process and create the necessary networks of expert etc. it is recommended to start with pilot activities in one of the bottom-up schemes and/or the missions and partnerships (see below).

- **Capacity Building in Science Diplomacy**

Many drivers and barriers for science diplomacy have been identified, e.g. lack of training, insufficient pluri-disciplinarity and problem analytic skills, rigid evaluation systems for researchers, generalist knowledge of diplomats, administrative barriers to the integration of scientists in the foreign affairs structures, etc.. As diplomacy is no longer focused exclusively on sovereign states but involves also non-state actors (para-diplomacy) more training is needed for multi-stakeholder diplomacy activities involving also stakeholders of the R&I ecosystem. With the better understanding of drivers and barriers, formal and informal education programmes for different stakeholders can be created. Furthermore, secondments of researchers in science diplomacy, science advice organisms or diplomatic bodies and of diplomats in research organisations may contribute to knowledge exchange and better communication. In particular coordination with and among the Member States and Associated Countries needs to be fostered, based on self-assessment tools and the development of science diplomacy strategies.

In principle, different capacity building activities related to Science Diplomacy can be applied to the whole Horizon Europe spectrum. However, to start the process and create the necessary networks of expert etc. it is recommended to start with pilot activities e.g. in the horizontal pillar of "Widening Participation and strengthening the ERA" or within MSCA (see below).

PILLAR 1 / Excellent Science:

EUROPEAN RESEARCH COUNCIL

ERC for Science Diplomacy Initiatives
Background and description of potential activities (What?) ERC's mission is to encourage the highest quality research in Europe through competitive funding and to support investigator-driven frontier research across all fields, on the basis of scientific excellence. Being 'investigator-driven', or 'bottom-up', in nature, the ERC approach allows researchers to identify new opportunities and directions in any field of research, rather than being led by priorities set by politicians. This ensures that funds are channeled into new and promising areas of research with a greater degree of flexibility. However, many of the ERC project results have immediate impacts on society and policy. The connection of the ERC knowledge and policy is therefore a low-hanging fruit. The above described **"Science Diplomacy Booster**" understood as a specific service could be made available to projects that would like to reach out to target groups in the foreign policy arena without interfering with the bottom-up approach of the programme or channelling money away from the calls. Through the booster, available ERC knowledge could be connected to global challenges helping to smooth the science-diplomacy interphase.
Targets and relevance (Why?) Dialogue between scientists / diplomats / policy-makers to support relationship building Engagement of Civil Society in STI / Citizen Science Scientific Advice / Scientific Evidence for Policy Making, in particular improving the use of bottom-up research in policy making Schemes of inter-academy cooperation for an European Academies' Science Advisory System Strengthening European science diplomacy by using established schemes

MARIE SKŁODOWSKA-CURIE ACTIONS

MSCA Fellowships for science-policy and science-diplomacy links
Background and description of potential activities (What?) While it is already possible in MSCA Fellowships to move between science/industry/society (NGOs), the opportunities available to MSCA Fellows to move into policy and diplomacy environments in already existing instruments should be made more explicit (see examples in the Individual Fellowships (IF) as well as the Research and Innovation Staff Exchange (RISE) scheme). Particularly allowing the possibility for scientists to apply for MSCA fellowships or include secondments in international organisations, at parliamentary science offices or in embassies would add value to the programme without interfering with the bottom-up approach of the programme or channelling money away from the calls and allow for a simple implementation of much needed science diplomacy fellowships.
Targets and relevance (Why?) Dialogue between scientists / diplomats / policy-makers Engagement of Civil Society in STI / Citizen Science Scientific Advice / Scientific Evidence for Policy Making feeding into foreign policy, in particular person-to-person working relationships through embedding of scientists in diplomacy contexts Schemes of inter-academy cooperation for an European Academies' Science Advisory System Strengthening European science diplomacy by using established schemes

RESEARCH INFRASTRUCTURES (RIS)

Supporting the Interface of RIs to Policy and Diplomacy
Background and description of potential activities (What?) Research infrastructures operating globally as well as on a regional scale, are certainly instruments of SD (see SESAME, CERN, SKAO, etc.). Most of these initiatives can be case studies to learn about drivers and barriers to international cooperation and how diplomacy can better support the preparation, set-up and running of such research infrastructures. In the EU context, the European Strategy Forum on Research Infrastructures (ESFRI) has started to strengthen its international outreach e.g. via setting up a Working Group for Africa. Furthermore, RIs should be encouraged to share good practices, create dedicated fellowships, and reinforce interfaces between science and policy (including foreign policy).
Targets and relevance (Why?) Dialogue between scientists / diplomats / policy-makers Scientific Advice / Scientific Evidence for Policy Making Engaging Research Infrastructures with international cooperation, engagement of Civil Society in STI / Citizen Science Engagement with the Private sector

PILLAR 2: Global challenges and European Industrial competitiveness

CLUSTER 1: HEALTH

International cooperation for infectious diseases
Background and description of potential activities (What?) Successfully addressing infectious diseases and antimicrobial resistance (AMR) requires not only scientific evidence and technological capacities, but also international cooperation activities to effectively prevent diseases. Specific actions to identify, strengthen and support links and complementarity between R&I projects and external policies could focus on strengthening partners with underdeveloped own capacities. The effective use of science diplomacy in the context of pandemics should not be taken for granted (see COVID-19 crisis). Protecting domestic population, as a foreign policy goal driven by the national interest, can play against collective action to tackle pandemics, and illustrates the limits of science diplomacy. Science diplomacy for infectious diseases needs to support the relevant ecosystem (including public health stakeholders) and adapt to respective medical aspects, to changing political and societal environments (e.g. new migration patterns), weak governance structures in some low-income countries or the shift in vaccination paradigms in states. Anti-microbial resistance is another topic of global interest with wide cooperation networks that needs tailored support. Furthermore, there are specific priorities identified in the field which should be supported with implementation activities. Networks should support the response to pandemics. Just as the Ebola crisis has highlighted diplomacy dimensions of science cooperation, material and regulatory infrastructure, and aligning science cultures, the emergence of Covid-19 highlights the importance of political culture, goals and interests in forming responses to pandemic and in the public health consequences. Here EU science diplomacy and health diplomacy have to be politically sophisticated – in inconspicuous, apolitical ways. While it may be unpalatable for European leaders and populations, still the EU has to be able to work effectively in, for instance, the infectious disease area in ways that do not threaten the domestic political stability. Experiences from projects like the long-standing cooperation between the EU and Africa in the framework of EDCTP (European & Developing Countries Clinical Trials Partnership) should be

taken into account accordingly.

Targets and relevance (Why?)

Addressing global challenges, sectoral science diplomacy / health diplomacy
Ensuring healthy living for European citizens
Peace and security
Dialogue between scientists / diplomats / policy-makers
Scientific Advice / Scientific Evidence for Policy Making
Engagement of Civil Society in STI / Citizen Science

CLUSTER 2: CULTURE, CREATIVITY AND INCLUSIVE SOCIETY

Grounding science diplomacy practices in Europe and beyond

Background and description of potential activities (What?)

Knowledge has always been a key part of Europe's international and external relations. With the concept of "science diplomacy", there is now possibility for a much more informed and inclusive debate around the use and role of "knowledge" for Europe's internal and external relations. This debate should also explicitly include the many non-state actors who historically, now and in the future are active in these knowledge relations. Science diplomacy, understood as a field of research at the intersection of science, technology and foreign policies has the potential to benefit both diplomatic and international relations and the scientific endeavour and its impact. Moreover, at the European level, science diplomacy can contribute to the strengthening of the European identity and values. For science diplomacy to be fully exploited there is a need to develop and align national and supranational science diplomacy strategies, to acknowledge and cultivate the multi-actor nature of science diplomacy where diplomats, researchers, international relations experts and civil society acknowledge the role of science diplomacy in taking the most out of scientific evidence for improving international relations and jointly addressing global challenges. There is also a need to understand why the "normative" vision does not always deliver its expected benefits. The time has come to identify the limits of science diplomacy, and to analyse when, where and why national and supranational science diplomacy strategies do *not* align. These issues are especially relevant at a time when the network of professional diplomats is enlarged or paralleled by a broader distributed diplomacy force, where different stakeholders have the potential to contribute to diplomacy around science, technology and innovation. As configurations in scientific and foreign affairs evolve and present new complexities, there is a need to train stakeholders to be able to cope with the challenge, to create and to renew networks. It is also important to increase awareness of the scientific dimension of the link between internal and external policies of several flagship areas (e.g. regional development, agricultural policy, etc.). What is the role, power and meaning of science in attaining this articulation? How are internal and external policies of the European Union linked and can science act as mediator? European policies in these areas (European Regional Development Funds, Common Agricultural Policy, Constructing a Common Digital Market, etc.) necessarily have an impact on external relations, with an undeniable science diplomacy dimension. Case studies of how science did and can intervene will provide a deeper understanding of the potential linkages. Last but not least, measuring the impact of Science Diplomacy is important. While the EU and member states are increasingly investing in science diplomacy, the parameters and evidence of the impact of science diplomacy is not well understood. The theory of change of science diplomacy is that by engaging in collaborative and mutual research geo-political differences can be bridged, as supposedly the 'language of science is universal'. However, very little evidence exists that this theory of change actually stands up to scrutiny. By engaging in long-term research into the effects of science diplomacy (e.g. with respect to SESAME or CERN) further programming in this domain can be strengthened.

Targets and relevance (Why?)

Strengthen Europe's geopolitical position and reinforcing multilateral system
Advancement of Science Diplomacy as a field of research
Dialogue between scientists / diplomats / policy-makers
Scientific Advice / Scientific Evidence for Policy Making

EU Research and Innovation and global governance

Background and description of potential activities (What?)

EU places global challenges at the core of its policy objectives and acknowledges the role of science in addressing these challenges as an important dimension of EU foreign policy and diplomacy. A "geopolitical Commission" needs to understand more explicitly the role of knowledge for European multilateral engagement. Part of this is forming a better understanding of the science diplomacy aspects of research and innovation policies, programmes and projects. Different parts of Horizon Europe, partnership programmes, large-scale research infrastructures, big science projects, bilateral and multilateral programmes of EU Member States cover different aspects of science diplomacy processes. Research does not yet cover the full spectrum of European R&I activities and the past, present and future effects on the geopolitical agenda.

Geopolitical conflicts of the future will also be linked to innovations, technologies and infrastructures (e.g. AI, 6G, Space/Satellites, Biotechnologies, etc.), as the complexity of technological landscapes surpasses traditional and even advanced capabilities for monitoring and mutual control. It is thus highly important to create the links and interactions between the emergent technologies and science competition hot spots and the sphere of international relations and to reinforce the global governance and multilateralism.

In particular, for mission-driven research, a whole-of-government and whole-of-society approach are necessary. Stakeholder groups need adequate communication channels. Foreign policy actors are highly aware of geopolitical drivers (e.g. demographic change, new powerhouses in the global economy, urbanisation, etc.), they can inspire and support the implementation. Dedicated two-way communication linking mission-driven research with foreign policy actors, will support international cooperation along flexible impact pathways.

These reflections have emphasized the importance of technology and innovation – and not only science – in shaping international relations. In the expression "science diplomacy", does "science" include innovation? This question is (almost) never addressed as such, and there is some confusion about the way the science-technology-innovation continuum is understood. There is in particular a need for more scholarship about "innovation diplomacy": is it a subset of "science diplomacy", or something different – perhaps closer to economic diplomacy? What is the place of competition in science diplomacy? In techno-diplomacy? In innovation diplomacy? Reflecting on such questions could help clarify the various dimensions of the EU's foreign policy and related diplomacy needs.

In addition, concepts, such as science diplomacy and grand challenges have recently made inroads into the policy portfolios of non-European states that have become powerful players but do not share Europe's principles of human rights. In this respect, it will be for European policymakers to understand the functions of these processes of isomorphic adaptation to position Europe in a considerate way and keep engaging in dialogue with civil societies of these states.

Targets and relevance (Why?)

Strengthen Europe's geopolitical position and multilateralism, Understanding science diplomacy potentials
Advancement of Science Diplomacy as a field of research; Dialogue between scientists / diplomats / policy-makers, sharing best practices, mapping; Scientific Advice / Scientific Evidence for Policy Making

Understanding the Belt and Road initiative*
Background and description of potential activities (What?) The positions towards the Chinese Belt and Road initiative (BRI) are diverse in different EU Member States. Systematic monitoring of the initiative, surveys of public opinion and stakeholder perspectives shall provide evidence to decision makers, yet these are weak bases for policies on European and EU-Member State level. The BRI is evolving quickly, and it is a question of understanding and engaging a rapidly developing technico-political and economic phenomenon. Europe has to consider the attempts of power transition from West to East in many domains, including research, education, science, technology, innovation. Europe has to balance the benefits of engagement with China in research, education, etc., with the corresponding drawbacks, while protecting its sovereignty.
Targets and relevance (Why?) Addressing specific geographical regions Exchange of Experience and development of joint European strategies Peace and security

***** In addition to the specific China related issue (that have gained political attention in the last year), a comprehensive topic on the "power of science research and innovation in global competition" covering a broader range of countries could be envisaged.

CLUSTER 3: CIVIL SECURITY FOR SOCIETY

The security aspect of science diplomacy
Background and description of potential activities (What?) There is an urgent need to get out of the naïve mainstream discourse on science diplomacy, driven by the idealism and internationalism of science. A more realistic view on science and diplomacy and on the balance of (soft and hard) power among nations is needed to support understanding and exercise of science diplomacy. Scientists are sometimes challenged by changes in the geopolitical landscape when their scientific interest is located in a conflict zone. Cooperation partners may be based in a "hostile country" and scientific activities might raise the interest of security stakeholders. Technological advances, cyber espionage and the issue of dual use present further challenges. Academic freedom needs to be safeguarded while European security interests need to be taken into account, especially since these dangers can be less than obvious and arise from unintended or alternative use or linked to "dual use". Scientists are often left alone to clarify the foreign policy implications of their research and no specialised clearing houses exist to address their questions as to the 'dangers' of their research. An open, critical debate in society about this question of "dangerous" research for European foreign and security policy should be stimulated. In regard to sensitive cases the science base itself needs to be built up. There are significant Intellectual Property (IP) problems (commercial or strategic) that have a strong science diplomacy dimension. An EU Action could improve understanding, connect the dots on a broad scale and provide tailored accompaniment services to scientists.
Targets and relevance (Why?) Peace and security Strengthen Europe's geopolitical position Addressing cyber espionage and challenges Addressing challenges presented through technological advances Management of global commons

Disaster resilience in the European Neighbourhood
Background and description of potential activities (What?) It is part of European risk assessment to understand natural and anthropogenic risks and the vulnerabilities created by their intersection, to support disaster management capacities in the Balkans and the EU Neighbourhood regions. As an action of science diplomacy, a wide variety of stakeholders and transdisciplinary aspects of disaster resilience should be addressed. Based on the expectation that countries in the close neighbourhood and enlargement area are going to associate to Horizon Europe, it is a win-win situation to call for specific cooperation projects which explicitly address issues such as earthquake research, climate risks (floods, landslides, droughts, wildfires, etc.), infectious diseases, contaminations etc. Dedicated projects strengthen capacities and mutual understanding in general and cooperative attitudes from a science diplomacy perspective (i.e. compared to other geopolitical stakeholders).
Targets and relevance (Why?) Addressing global challenges Strengthen scientific responses to natural and human-created disasters, disaster risk management (preparation, prevention, mitigation) and preparation for crisis management Strengthen Europe's geopolitical position Supporting good mutual relations Enhance Europe's soft power Addressing specific geographical regions

CLUSTER 4: DIGITAL, INDUSTRY AND SPACE

Space diplomacy
Background and description of potential activities (What?) Space is one of the "global commons" and cooperation in space has often historically been mentioned as one of the examples of science diplomacy. The balance between cooperation and competition in space is currently shifting and private sector stakeholder interests are also gaining importance. The US Air Force Space Command, now US Space Force, states clearly that space is the "ultimate high ground" dominating all other battlefields. It is important to be clear about both the "commons" and the "high ground" dimension of space. The qualitative shift in international politics and security as after 1945 creates an urgent need for "arms control" in space but this is hampered by a still-poor understanding of the issue, its complexity, and the number of state and non-state actors involved. In this setting, Europe needs both the space industry and the intellectual and strategic capacity around governance of space (including possible space arms control). Europe intends to develop a European space industry and needs to ascertain its scientific and technological capabilities, but also its negotiation competences and ensure the flow of knowledge between science and policy makers. Supranational organizations as well as Member States require tailored scientific input. In the EU's space diplomacy, economic and industrial dimensions often are given more importance than the techno scientific dimension. Therefore, space diplomacy should not be locked within the frame of science diplomacy. Conceptual reflection is needed to articulate scientific, technological, industrial and business challenges in space diplomacy, as well as the underlying soft and hard power dimensions.
Targets and relevance (Why?) Addressing global challenges Addressing challenges presented through technological advances Management of global commons

Cyber science diplomacy, big data, artificial intelligence and digital transformation

Background and description of potential activities (What?)

Cyber technologies may represent a qualitative shift in international affairs (as did the atomic bomb in 1945). Cyber security has become a top diplomatic issue for the EU. Cyber dangers range from the disruption of local infrastructure, to values and material damage, to catastrophic danger in the entanglement of nuclear, space and cyber, where space and cyber may undermine strategic stability in crisis situations. The 2015 Council Conclusions on Cyber Diplomacy proposed a range of specific objectives and principles for preventing conflict, reducing threats to cyber security, and increasing stability in international relations as regards cyberspace. The EU Cyber Diplomacy Toolbox was adopted by the EU in September 2017. It completes a triad of important EU cyber diplomacy documents. The toolbox's purpose is to encourage greater cooperation and more agile joint EU diplomatic reaction to malicious cyber events. It articulates possible countermeasures, including sanctions that could be taken to respond to cyber-attacks originating beyond Europe's borders. Based on several projects, the landscape of cyber security and cyber diplomacy in European Member States is developing and trans-border cyber security through diplomacy and research is mentioned in strategic approaches on EU and Member State level. Currently, the strategic cyber partnerships with Japan and the United States are the EU's most highly developed, as well as other global initiatives (see G7 Global Partnership on Artificial Intelligence) including elements of cyber science diplomacy. There are differences between the EU Member States to implement cyber science diplomacy. It is important to understand the possibilities and support joint action. At the same time, the mainstream approach to science diplomacy based on idealism and universalism is rather uncomfortable for addressing a topic like cyber security, because of the open confrontation manifested between national powers in this domain, and the more covert conflicts and power plays by private sector or darker interests. This is an area where the dominant approach of science diplomacy is not very suitable. The limits, conceptual and practical, of science diplomacy should be identified and addressed when developing a European cyber security policy.

Another area potentially to be further developed and addressed are **'Ethics Guidelines for Trustworthy Artificial Intelligence'**: https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines#Top, including Ethics by design. In several contexts, cooperation priorities on the strengthening of ethical AI have been identified (Canada, Japan, etc.). Strong secure environments are needed that focus on transparency and not social control. Establishing Europe as a cooperation partner for those countries with shared values and positioning itself with responsible planning. Emphasis shall be put on EU based standards and certification. Historical inquiry into the evolution of ethical arguments across post scientific endeavours is needed. Better understanding is needed if different values and interests among European Member States and citizens shape different ethical expectations. Which are the potential pitfalls along the paths to standardisation?

Targets and relevance (Why?)

Peace and security
Addressing global challenges
Digital Europe - enhancing Europe's digital capacities
Addressing challenges presented through technological advances

CLUSTER 5: CLIMATE, ENERGY AND MOBILITY

Climate (and energy) diplomacy for the European Green Deal
Background and description of potential activities (What?) The European Union aims to be a leader in the transition to sustainability and achieving the climate objectives. It is a clear geopolitical objective, and of course this priority must be echoed in the support provided to research and technology, including proactive policies. European stakeholders all over the world need to feel empowered to promote solutions for climate neutral societies developed in Europe. Effecting change in the climate area requires strong scientific leadership, deep understanding of the scientific facts in the policy making community, and highly visible scientific credibility of European research corps. Supporting the European Green Deal, several international cooperation actions can be implemented. The indirect and implicit science diplomacy effects need to be understood and tailored support for communication of European activities is needed.
Targets and relevance (Why?) Supporting the Green Deal Dialogue between scientists / diplomats / policy-makers Scientific Advice / Scientific Evidence for Policy Making Engagement of Civil Society in STI / Citizen Science

Science and diplomacy in the polar regions: a historic opportunity for the EU to act for the planet
Background and description of potential activities (What?) The ice of the Arctic and Antarctica is melting at an unprecedented rate. As they heat proportionally faster than other parts of the globe, warming at the poles is changing accessibility and economic activities and at global level creating dramatic measurable effects on sea level rise and weather disruption. Never has the importance of the polar regions for human and planetary survival been clearer, and the impact of climate change on the poles will serve as a litmus test for what happens to the rest of the planet. In the coming years and decades, the Arctic and Antarctic regions will be of greater strategic and geopolitical significance both for Europe and globally. The EU has a key role to play in advancing science-based policies that respect the need to protect the polar regions as global commons, free from military tensions. EU research and innovation should be on climate change mitigation, international cooperation at the climate-environment-ocean nexus, and optimisation of polar research infrastructures. Linking EU Arctic and Antarctic strategies will enable achieving wider goals in EU climate policy, neighbourhood policy and external relations and promote a sustainable future for all.
Targets and relevance (Why?) Dialogue between scientists / diplomats / policy-makers Scientific Advice / Scientific Evidence for Policy Making

CLUSTER 6: FOOD, BIOECONOMY, NATURAL RESOURCES, AGRICULTURE AND ENVIRONMENT

Science in Water Diplomacy in Central Asia

Background and description of potential activities (What?)

The recently established platform in relation to water science in and with Central Asia is one of the examples of fostering mutual understanding, stability and progress. In order to further support this evolving cooperation, dedicated small-scale scientific projects on water quality, water safety, water security, cost-benefit analysis of water use scenarios, foresight, etc. will continue to be needed. Science policy interfaces bringing the scientific results into decision making processes are to be designed and supported.

An interesting question, however, is whether the European Union engages only "for the common good", or also - and to what extent - to advance its own geopolitical interests and influence in this part of the world. This deserves to be studied as such.

Targets and relevance (Why?)

Addressing specific geographical regions
Supporting the geopolitical position of Europe, building bridges
Peace and security
Supporting European soft power
Cultivating international partnerships and connecting stakeholders
Supporting the management of shared resources

Addressing global biodiversity loss

Background and description of potential activities (What?)

Europe can use its research capacity to support the global communities with research on biodiversity and recommendations on how to halt the current loss of biodiversity (the 'sixth mass extinction'). In particular, research cooperation with stakeholders in Latin America and on the African continent will create positive impacts for the world as well as for Europe's science diplomacy objectives.

Within Europe there are also opportunities for collectively addressing biodiversity loss, e.g. through shared habitats (transboundary rivers, forests, migration corridors, etc.), and the impact of farming practices (e.g. those supported by CAP).

Internationally, defining areas of common concern or action can help shape global targets under the Convention on Biological Diversity and the updating of the Aichi targets.

Targets and relevance (Why?)

Addressing global challenges
Collaborating for greater discoveries
Dialogue between scientists / diplomats / policy-makers
Scientific Advice / Scientific Evidence for Policy Making
Engagement of Civil Society in STI / Citizen Science
Scaling existing collaborations
Management of global commons

MISSIONS AND PARTNERSHIPS

The Missions and Partnership initiatives will develop their individual strategies for international cooperation and Science Diplomacy as appropriate, mainly targeting global challenges. They could be supported via the Science Diplomacy booster as described above. However, in this case the link between the science/innovation and policy sphere could not only be made "ex-post" by providing relevant results and knowledge but already in earlier stages to include the policy/diplomacy sphere in the contextualisation of the research questions/ innovation needs / diplomacy challenges

PILLAR 3 - European Innovation: Science Diplomacy potential of Innovation networks

Bottom up innovation networks such as ENRICH Innovation networks outside Europe allow the European Union to reach out to new markets and use their availability to promote the European Research Area as a place of innovation that produces knowledge, goods and services in sectors of the scientific frontier and that has the potential to be a world reference in certain technologies. The strategy of these ENRICH centres could include a Science Diplomacy approach to reinforce their activities.

When it comes to innovation, product design and product development, standardisation is an important, often neglected issue. The EU could envisage to **use the international fora and bodies for standardisation** in a more strategic way to **promote and enforce standards developed at European level / standards shared by EU Member States and to approach non-state actors (e.g. multinational firms) to reconcile EU standards with market-driven choices.**

Moreover, in the context of Science Diplomacy effort done at European level it is key to understand, monitor and analyse the position of EU R&I in specific countries - especially where such networks are not yet present, such as Africa - vis-à-vis other global powers, through studies, including the feedback from EU MS science counsellors and Embassies in these countries, including feedback from EU science counsellors.

Within the Horizon Europe part related to "Widening Participation and Strengthening the European Research Area", the following activities related to Science Diplomacy could be envisaged:

WIDENING PARTICIPATION AND SPREADING EXCELLENCE

Capacity building in science diplomacy
Background and description of potential activities (What?) Based on the description of Capacity Building in Science Diplomacy as elaborated above, this part of the programme could implement respective activities such as - mutual learning exercises (within European and MS diplomatic bodies, for instance); - mapping of current policies and needs, which could contribute to a common understanding of science. Diplomacy; - training activities for researchers, diplomats, policy officers from e.g. ministries of research and other groups dealing with Science Diplomacy - strengthening Science diplomacy networks in Europe and globally - promotion of trusted Scientific Advice to help building more resilient societies. These activities would function as pilot phase, allowing to test which endeavours could be usefully integrated into a European *Science Diplomacy Hub/Platform* at a later stage.
Targets and relevance (Why?) Multi-stakeholder management for multi-track diplomacy

Dialogue between scientists / diplomats / policy-makers
Scientific Advice / Scientific Evidence for Policy Making
Engagement of Civil Society in STI / Citizen Science
Strengthening European science diplomacy by using established schemes

REFORMING AND ENHANCING THE EUROPEAN R&I SYSTEM

Diplomacy to promote Open Science, academic freedom and scientific values

Background and description of potential activities (What?) In order to promote open science, open access, open data, a global alliance needs to mobilise stakeholders beyond the scientific community. Promoting open science is closely related to promoting European values such as openness, transparency, research integrity etc. with a view to making a new generation of European researchers and innovators grow. The topic can be a crystallizing point to bring together the science and foreign policy community. It is closely linked to data diplomacy and issues of balancing important open layers of knowledge and exploitation (f.i. Human Genome Project). Furthermore, it is of high importance in fostering collaboration and cohesion in critical topics such as health emergencies, climate change, etc.

The "values of European research" are an essential stake of the soft power of the Union, through the projection of its research policy towards the rest of the world. There is a "European" way of doing science, and this includes particular models of the relationship between research activity and the market. The economic challenges of scientific publishing are relevant here, as are questions of economic consequences of open science.

"Third-sector" science, citizen science, participatory science and crowd-sourced science: all these new forms of data acquisition and inquiry cut across borders and pose specific challenges to disciplinary traditions. The densely networked nature of such science communities, frequently also transnational, can create parallel circuits of science communication and development that escape national control even more blithely than cooperation between established STI institutions. What are the implications for national and regional science policy, for harmonizing internal and external European policies? And, how can third-sector science contribute to integrating local, national, regional levels in the face of issues that require scientific support? Given both the elusiveness and the potential of third-sector science, what are the implications for diplomatic relations around science interests?

Another aspect to be addressed to ground SD practices is to support academic freedom on which excellent and sound science depends on.

It is important to analyse and reflect on the different aspects of academic freedom and how they can be enforced and ensured in a structured and effective way in different forms of societies. As scientific freedom is challenged within certain Member States as well as globally there is a real need to work on understanding the threats and costs of missing it and cooperate with different international schemes. Several threats are also associated (intellectual property, economic, civil and even military security). The internal and external policy challenges need better articulation.

Targets and relevance (Why?) Dialogue between scientists / diplomats / policy-makers, using diplomacy more pro-actively to reach goals important for the scientific community (diplomacy for science)
Scientific Advice / Scientific Evidence for Policy Making
Opening up the scientific system, engagement of Civil Society in STI / Citizen Science
Reaching Responsible Research and Innovation objectives, promoting Open Science internationally
Promoting European values
Strengthening European science diplomacy by using established schemes