FFI Strategic Initiative

Systems-of-Systems for Smart Urban Mobility (SoSSUM)

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1. Summary

This document describes an FFI strategic initiative in the area of system-of-systems (SoS), with applications to smart urban mobility of people and goods. The initiative is motivated by a number of technology steps that will, during the next 10 years, reshape the automotive industry through connectivity as a standard feature and increasing electrification and automation. This gives a potential for a fundamental change of the urban transportation system towards collaborative solutions. SoS engineering is a key for this potential to be fulfilled. SoS solutions and knowledge will be crucial in making it possible for vehicles and other systems to collaborate in order to achieve goals on a higher level.

The initiative therefore has the dual and interdependent purposes of (1) developing and validating potential effects of smart urban mobility solutions based on SoS, and (2) creating a coherent knowledge base for SoS engineering in the urban transportation domain. The initiative will be directed by stakeholder goals on transport efficiency and quality, and societal goals on environment, safety, and resource utilization.

The initiative will consist of a number of projects which contribute with specific solutions for smart urban mobility and report experiences from applying SoS. In addition, there will be a set of core activities to: define and validate the overall strategy for using SoS to provide urban mobility solutions; provide a synthesis of state-of-the-art and knowledge results; and provide meeting places. The core activities also contain a program office function, responsible for initiating calls, managing the project portfolio, and acting as a liaison to other programs.

The results are: a validated strategy for smart urban mobility using SoS; a significant knowledge increase in SoS engineering; a number of applications of smart urban mobility that are developed and validated; an active competence network; and foundations for standardization. The initiative will involve a broad range of stakeholders including the vehicle and transport industries; cities; authorities; IT and communication providers; service developers and providers; and universities and institutes. The initiative will be carried out during 2018-2021. The budget is 50 MSEK public funding, and at least 50 MSEK funding from industrial partners.

2. Background

Cities around the world adopt the **Smart City** concept and investigate how they can integrate latest generation information technology to make city operations support societal targets including sustainability, efficiency, safety and local economy. This digitalization of society is driven by the increasing access to fast and cheap communication and computation, and it addresses a wide range of city challenges across all policy areas, including mobility, environment, energy, government, health and city planning.

A common pattern in these smart city concepts is to set up responsive services that balance demand and supply in a system, such as offering **smart urban mobility** through on-demand end-to-end transportation, rather than fixed schedule services. For personal mobility, this includes public transit and shared mobility services. For city goods distribution, connectivity solutions can be used for optimization of logistic chains and utilization rate of vehicles, and can even include futuristic solutions such as last-mile delivery robots and drones. Network effects such as cost reduction, better use of space and increased quality of life for citizens are expected. In the long term, these mobility scenarios should be understood in a context where vehicles will become more and more electrified; self-driving at an increasing number of locations and road conditions; and equipped with high-speed connectivity to off-board systems.

The future Smart City can be seen as an interconnected **system-of-systems (SoS)**, where previously isolated systems get digitally connected to enable collaboration. It thus forms a vast network open for multiple actors where new ways of offering services to citizens, businesses and entire cities become possible. The key characteristic of an SoS is that the constituent systems retain their independence, and are thus not tightly integrated into one unit. They are owned by different organizations, have their own objectives, and evolve at different paces, but they choose to voluntarily **collaborate** to achieve common advantages. In doing so, they also create relations and mutual dependencies among the constituent systems and their owning organizations.

The collaboration in an SoS is enabled by communication. By exchanging information with other vehicles and off-board systems in a smart city SoS, a possibility is created to coordinate vehicle movements for smoother traffic flows, better situational awareness to avoid accidents, and optimizing logistic chains. In the process, data from the individual vehicles is exchanged, but also real-time open city data and personal user data, e.g. from mobile devices.

In 2015, a number of actors from the vehicle industry, but also from other domains, developed a **strategic research and innovation agenda for SoS in Sweden** to address these issues. The main conclusion is that Sweden needs a world-leading capability to rapidly develop trustworthy SoS. The agenda contains an outlook, which indicates that many other countries are ahead in the area, but that this is mostly for military applications. There is therefore a large potential in strengthening the competitiveness of Swedish industry by applying SoS in commercial systems, such as vehicles and transportation. There is simply a lack of knowledge in how to build successful SoS.

The timing is right for Sweden to lead a technology adoption where interconnected vehicles and urban systems contribute to the quality of life for individual owners as well as for society at large. There is an opportunity to create an open and inclusive environment, both physically at street level, and digitally in the SoS that constitute the future of cities worldwide. Sweden also has a competitive advantage by being a comparably small country while still having a significant number of world leading manufacturers of cars, busses and trucks. The successful implementation of such visions requires new competences in SoS and close cooperation between public and private partners to assess the system-level effects of new approaches.

3. Purpose of the strategic initiative

The **purpose** of this initiative is two-fold:

1. Develop and validate potential effects of **smart urban mobility solutions** based on SoS.

2. Create a **coherent knowledge base for SoS engineering** in the urban transportation domain.

These two purposes are highly interdependent in that the smart mobility solutions require improved SoS knowledge to become successful, and in that the SoS knowledge generation is driven by needs and experiences from developing the applications. All activities within the initiative will thus address aspects of both purposes.

The initiative will seek to improve how **primary transportation needs** for both people and goods can be fulfilled within cities, with a focus on:

- **Efficiency**: Transportation should be fast and cost-effective, and there is thus a need to limit congestions and improve traffic flows.
- **Quality**: It should be possible to predict arrival time, and hence the transportation system needs to be reliable and robust, and provide a transparency for users to monitor its state. It should provide flexible, comfortable and secure means of mobility.

The initiative will also reflect **societal targets** to deal with the side effects on transportation in order to make cities attractive and give citizens a high quality of life:

- **Environment**: This has both a global dimension, where the climate footprint of transportation needs to be reduced, and a local dimension, where the air quality and noise levels need improvement.
- **Safety**: It is necessary to continue the reduction of transportation related accidents in city traffic.
- **Resource usage**: One of the scarce resources in a city is land, and it is desirable to minimize the usage for roads and parking. Energy and public funding are also limited resources, which should not be spent more than necessarily on transportation and infrastructure.

Obviously, there are conflicts between some of these targets, and the initiative will deal with necessary trade-offs by applying a systemic approach to smart urban mobility.

Related initiatives

There is already a limited number of projects that address SoSSUM related problems. Those projects are spread over a number of different programs, and are thus not co-ordinated.

- Within the **FFI** program, there are some projects addressing co-operative intelligent transportation systems (C-ITS), for instance for truck highway platooning and for co-operative driving in inner cities. A few projects have investigated business models and ecosystems for electric charging, and in relation to big data analytics technologies. Finally, SoS architectures have been studied, but from the perspective of adapting the vehicle to become part of a larger SoS.
- Within the **Strategic Innovation Programs** (SIP), two initiatives stand out as being relevant to SoSSUM. The first is **Drive Sweden**, which have some projects related to urban mobility, and some that include aspects of traffic control systems and mobility as a service. The focus is however to a large extent on automated transportation system. The second initiative is **Viable Cities**, which has recently started and does not have any concrete activities yet. Its scope is not limited to mobility, but it focuses on general aspects of future cities.
- **MISTRA** has a program related to sustainable accessibility and mobility services (**SAMS**). The focus appears to be on high-level societal effects, and not so much on the technical solutions for the services.
- The Swedish Transport Administration (**Trafikverket**) has funded several research projects that study the effects of automation, and around more efficient usage of the transport infrastructure.

- The Swedish Energy Agency (**Energimyndigheten**) has also funded research into mobility, with an energy focus, and relevant parts of this include different ways to encourage shared mobility.

A common denominator is that these initiatives are quite isolated, and therefore do not have access to generic knowledge on how to engineer SoS, nor can they feedback experiences that further the development of the body of knowledge. Some of the projects are carried out from the perspective of a single stakeholder (e.g. the vehicle manufacturer), which means that the starting point is the individual system, when it would be more appropriate to instead take the overall SoS as the system-of-interest.

This initiative thus fills a gap when it comes to developing the generic knowledge base and to make the collected knowledge available to future projects and initiatives within both the different FFI subprograms, and in other programs outside FFI. To ensure that SoSSUM maintains a close contact with other related programs, and together with them can address the overall societal challenges, a liaison function will be created within the initiative.

4. Description of the strategic initiative

The proposed strategic initiative will now be described in more detail. First, the respective focus areas related to the purposes of smart urban mobility applications and SoS knowledge development are described. Then, an overview is given of how the work in the initiative will be organized to achieve the desired effects.

Scope and focus: Smart urban mobility applications

In the application domain of smart urban mobility, the aim is to develop a set of solutions based on SoS that address important societal challenges within cities, as well as providing better transportation solutions to end users. Use cases include people transportation such as the daily commuting; travel as part of work; and rare traveling. For goods, the uses cases include small goods transported to households and businesses, often as a result of e-commerce; large goods, such as material and bulk cargo to industries, construction sites, or for maintenance; sensitive goods such as fresh food; and waste removal. Different modalities exist for all these, including non-motorized (walking or bicycling); cars and other small vehicles; and larger vehicles such as trucks, trams, buses, underground, railways or boats.

A few perspectives will be central in developing successful transport solutions:

- **Systems thinking**: The focus of the initiative is more on the whole than on the parts. This means that it is more relevant to build knowledge on how existing pieces of technology can be put together in new ways to solve urban mobility problems, than to develop new technologies in isolation.
- **Trade-offs between conflicting needs**: As described in the previous section, the transport needs, with characteristics such as efficiency and quality, are sometimes in conflict with societal needs, such as environment, safety, and resource utilizations. The initiative needs to take both these levels into account, and strive for acceptable trade-offs between them.
- **Sustainable business models**: Proof of concept demonstrations of technical solutions to transportation needs are important, but it must also be shown that an application function or service is sustainable over time. The core aspect of this is that all involved stakeholders will need to gain more than it costs to them, to give

them incentives to uphold their commitment to the service over time. This requires that the whole life-cycle of the service is considered.

- **Behavioral issues**: Many ideas for new services implicitly assume behavioral adaptations among its users, and the willingness to adapt is often exaggerated. It is thus necessary to analyze potential obstacles to such adaptations, including side effects and constraints which may not be obvious from the beginning.
- **Local and global relevance**: Although many of the application examples will take needs of Swedish cities as a starting point, a global perspective should also be considered. This is to ensure that experiences gained from the initiative can help Swedish industry to develop applications that can in the long term also become successful export products.

A number of conceptual elements are expected to be present in many of the applications of smart urban mobility. A non-exhaustive list of such concepts includes:

- **Multi-modal transportation**: Cities are not uniform, and there are two disparate trends in city development. One is to densify the city centers, and the other is sprawling in the suburban areas. For this reason, different travel modalities will be optimal in different parts of the city, and as a consequence many transportations will need to be multi-modal.
- **Mobility-as-a-service**: Increased sharing of resources such as vehicles is a potential solution to many of the city challenges, and this sharing economy will allow optimization beyond what is possible when individuals own private vehicles with exclusive access. This will require understanding of trade-offs towards e.g. flexibility.
- **Shared data and information flows**: Information is key to more efficient resource usage and more flexible and efficient transportation. However, in an SoS the needed information is usually distributed among several independent actors, that need to agree on sharing data with each other, and the flow of information that results may also affect the technical architecture as well as security and integrity.
- **Mediators and aggregators**: To provide the new transportation services, there will often be a need for mediators, in the form of IT systems that co-ordinate traffic and transportation needs, or that aggregate data from many sources in such a way that other services can build on it. A key question is whether any of the existing transportation system actors will expand into these roles, or if other organizations will emerge.

Since a number of programs exist already, which partly relate to the same questions as SoSSUM, the initiative will strive to reduce overlap. For this reason, the perspective of city developers will not be in focus, since it is expected to be covered by the Viable Cities SIP. Also, this initiative will not develop technology for automated transportation and autonomous vehicles, since this is covered within the Drive Sweden SIP as well as sub-programs of FFI. (These delimitations do however not exclude that services developed for other purposes also provide data that could be used by city developers, nor does it exclude the use of automated vehicles as part of an application within SoSSUM.)

Scope and focus: SoS knowledge development

Within the knowledge domain of SoS, the focus areas are based on the main challenges identified in the aforementioned SoS strategic research and innovation agenda, and include:

- **Architecture**: The overall system structure is a key for a well-functioning SoS, and this includes the architecture of the SoS as a whole, but also the mechanisms in the constituent systems in order to adapt them for collaboration within an SoS.
- **Interoperability**: A prerequisite for collaboration between systems is that they can exchange information between each other and interpret it correctly. There are challenges at many levels, from basic communication network questions, to syntax (how information is represented), semantics (what it means), and pragmatics (what to do with it).
- **Trustworthiness**: In order to rely on SoS also for critical applications, they must be trusted, and hence methods for ensuring safety, cyber-security, personal and business integrity, and risk management are central.
- **Engineering tools and methods**: An SoS is developed in collaboration between the organizations behind the constituent systems. This leads to new challenges related to information sharing, requirements, verification and validation, and simulation, which requires new or adapted processes, methods, and tools. New technologies, such as Artificial Intelligence, are also becoming relevant and require adaptations of the engineering methods.
- **Business models and legal aspects**: It is easy to come up with examples of applications where inter-vehicle collaboration seems beneficial, but it is often more difficult to find a business in it. New business models need to be developed, where the balance between different stakeholders is handled, and where the degree of openness in the systems can be determined from a business perspective. Principles must be better understood for the kind of agreements that are needed between the organizations, such as service level agreements, and how they should be designed and handled in a dynamic SoS. These aspects are determining the willingness of organizations to participate in the SoS ecosystem and support its development.
- **Socio-technical aspects**: An SoS usually has human users, but there is also an interplay between the involved organizations. Therefore, a socio-technical perspective is needed that evaluates the relations between technology, individuals, and organizations, to achieve a successful SoS.

Core activities

The work in the strategic initiative will be carried out as a set of common core activities and a portfolio of R&D projects. The core activities will start a few months before the R&D projects and continue throughout the duration of the initiative. They aim at ensuring that the different activities in the program become closely connected, and that a continuous knowledge feedback occurs both between the projects and towards the common body of knowledge. The core activity will also monitor and evaluate that the different solutions can co-exist and integrate, thereby ensuring that the result is not a set of solutions that only will function in isolation.

The **core activities** are:

- **Program office**: To keep activities in the initiative together, and ensure that the overall targets are addressed, there will be a program office function. Its main responsibilities are to initiate calls for project proposals; manage the project portfolio towards the targets; and act as a liaison to other initiatives both within and outside FFI.

- **Strategy development**: To give the transportation system stakeholders in general and the initiative in particular a proper direction, a strategy within the area of SoS for urban mobility will be developed and validated. It will be based on both monitoring of international urban transportation trends for people and goods, and on interactions with different stakeholders in society. This activity will be in focus during the first year of the initiative, when it will refine and quantify the effect logic. During the remaining years, it will be maintained and validated through different proof of concept studies in the various R&D projects. In the final year, the results from the projects will be incorporated, and the strategy will be extended to cover the next phase beyond this initiative.

- **Knowledge synthesis**: The individual R&D projects will be followed closely by the core activity, and be expected to continuously contribute to the common body of knowledge on SoS engineering. In addition, efforts will be made to collect existing knowledge, e.g. from the research literature, and make it available to the initiative.

- **Meeting places**: To further improve the communication within the initiative, but also broaden it to relevant actors in society at large, meeting places will be created that are partly also open to people from outside the vehicle and transport sector. Concrete activities include annual conferences, but also efforts to connect to the international knowledge in the area, e.g. through study visits to important R&D environments. The intention is to organize and host the leading international conference in the area (IEEE International Conference on System-of-Systems Engineering) in Sweden within the duration of the initiative.

R&D projects

The largest part of the initiative will consist of a number of R&D projects, that will be decided during the execution of the initiative through several open calls for proposals. The projects will typically be between TRL levels 3-7.

Each of these projects will be required to:

- Investigate a particular urban mobility application.
- Evaluate effects on some of the challenges of urban mobility through analysis, simulation, or proof-of-concept demonstrations.
- Be based on collaboration in an SoS, involving representatives of relevant actors.
- Consider human behavioral changes that are assumed or required.

Moreover, each project is required to add to the SoS knowledge base, through interactions with the core activity and other parallel SoSSUM projects. They are also assumed to publish scientific results on SoS applications in urban mobility.

The initiative will strive for complementing projects that together provide a holistic result covering the identified urban mobility challenges and knowledge focus areas. Therefore, ensuring a sufficient coverage of these areas will be among the criteria when selecting the combination of projects that will be included in the portfolio.

In addition to projects that are centered around an urban mobility application, the initiative may also initiate a few projects that focus on recurring SoS engineering needs that are identified either as a result of strategic investigations or that are common to a number of the application projects.

5. Expected results

An effect logic for the initiative has been developed, which is shown in an appendix to this document. It describes in more detail the tangible results from the activities, as well as showing what the expected longer-term effects are and how those relate to goals of the overall FFI program and of society.

In summary, the initiative is expected to yield the following overall results:

1. A validated **strategy** for smart urban mobility based on SoS, identifying dimensioning factors, efficiency potential, and a vision and roadmap for the area.
2. A **significant knowledge increase** and improved ability to develop SoS for a number of actors, in particular within the identified SoS focus areas, with a basis in state-of-the-art analyses.
3. A number of concrete **applications of smart urban mobility** that are developed and validated within the projects.
4. An active **network** related to SoS with actors both within and outside the vehicle and transportation sector.
5. Foundations for **standardization** of key technologies, methods, and processes, that are required for collaborating systems.

6. Contributions to FFI targets

As illustrated in the effect logic (see appendix), this initiative will contribute to all the three major goals of FFI, as well as to societal challenges of urban mobility. In this section, the contributions to FFI targets is presented in more detail and on three levels: first, the overall motivations of the FFI program are addressed; then, it is analyzed how the roadmaps of the individual FFI subprograms benefit from the initiative; and finally, it is shown how the initiative fulfils the requirements that FFI has stated for strategic initiatives.

In relation to **FFI overall ambitions**, the initiative has significant potential in the future integrated and automated transportation systems for goods and people in urban environments on a system level:

- Fossil usage: reduced towards zero
- Deaths and injuries: reduced towards zero
- Congestion: significantly lower
- Health considerations: significantly better

- Travel time: significantly shorter
- Cost of person-km (for people) and tonne-km (for goods): significantly lower

By developing novel solutions for smart urban mobility with applications in Sweden, industry gains knowledge about the features of new products that can be marketed globally. The improved SoS engineering knowledge and capacity will also be instrumental for increasing competitiveness as digitalization accelerates.

Within the roadmaps for the individual subprograms within FFI, a number of areas that require collaborative systems are defined. Examples are:

- **Traffic safety and automated vehicles**: “Automated vehicles in the transportation system”, aiming for improved safety, efficiency and environmental improvements.
- **Electronics, software, and communication**: “Electric architecture – Off-board”, and “technology for green, safe & connected functions”.
- **Efficient and connected transportation systems**: Automation, e.g. for platooning, connected services, and adapted transportation solutions.
- **Energy and environment**: Large potential for improvement through better coordination of vehicle movements on both a micro and macro level.

Other subprograms would also have large benefits from SoS knowledge, even if it is not directly indicated in their current roadmaps. For example, **Sustainable production** will be heavily affected by developments in Industry 4.0, where collaborative production systems based on SoS principles are a central part.

Even if the application area of the initiative is in smart urban transportation, one of the main purposes is to provide common SoS knowledge that is required within all the subprograms to achieve their targets, and reduce the fragmentation that makes efficient system collaboration impossible.

The initiative fulfils FFI requirements for strategic initiatives as follows:

- **Contribute to a shift in the business domain**. Future smart urban mobility solutions will be quite different from today’s, and will include new technologies, actors, and business models. The magnitude of this change is difficult to handle within the ordinary FFI subprograms.
- **Potential to produce ground-breaking results**. The innovation potential is high in the urban mobility field, in particular across different societal sectors, and there is also a potential for making a leap in SoS engineering knowledge.
- **International dimension**. EU has funded several SoS related research projects, but with very limited Swedish involvement. This initiative will contribute to increasing our knowledge in the area, and thus make industry, universities, and institutes attractive as partners in future projects. There are also several activities related to strengthening our international position in the initiative.

7. Stakeholders

The initiative addresses a number of broad societal issues, and therefore it also involves a wide range of stakeholders that need to be actively involved in a true Triple Helix collaboration:

- **Vehicle manufacturers and suppliers**: Vehicle OEMs need to understand how to make their cars, trucks, or buses attractive for future urban transportation, and how to make them efficient participants in an SoS. They also need to consider what role they wish to take as service providers, and not just manufacturers of hardware.
- **Transportation providers**: Haulers, distribution companies, hub operators, public transportation, rentals, waste collection companies, etc. need to understand how their services can be improved through the participation in an SoS. This can also include actors with novel business models that utilize the connected, electric and/or automated vehicles for higher levels of optimization in the transportation system.
- **Road administrators and authorities**: Cities and road administration agencies play an essential role as being responsible for the street networks. They also need to provide traffic management centers to optimize the utilization of road networks, foresee and handle congestions and deal with exceptional emergency situations. Further roles include procurement of public transportation, road infrastructure maintenance, and regulation of traffic through restrictions and incentives.
- **Infrastructure providers**: The enabling infrastructure for smart urban transportation, and for SoS in general, is communication networks and data processing services such as cloud centers. In addition, infrastructures such as parking providers, energy suppliers (electric and fossil), and insurance companies may be necessary depending on the applications.
- **Service developers and providers**: New values are primarily created through innovative services based on IT and software solutions, through the information that is shared within an SoS. These services can be created for the citizens or for businesses. Examples include logistics coordinators, service brokers and orchestrators, and mediators providing platforms for data sharing or aggregation.
- **Property owners and local businesses**: Local businesses that wish to attract people to their locations or events have an interest in ensuring that transportation there and back is smooth. Property owners also want accessibility to people and goods deliveries, but at the same time also minimize disturbances from traffic.
- **Universities and institutes**: New scientifically based knowledge is needed within SoS, and should be made available through education and within the research communities.
- **Citizens**: The people living in the cities are in many cases the end users of smart urban mobility. They will make important choices, such as whether to own their personal vehicles or use other means of transportation, e.g. services consisting of several modalities. Additionally, they are also affected by transportations that they are not direct beneficiaries of, and as tax payers involved in the investments into infrastructure.

8. Budget

The initiative has a planned duration of four years, from 2018 to 2021. The duration is motivated by the need to have several project calls, where later calls can be based on insights from the early projects and strategy work. In this way, gaps in the R&D project portfolio can be filled in the later calls.

The total budget is 50 MSEK in public funding, and at least 50 MSEK from industry. The following table illustrates how the public funding (in kSEK) will be allocated over time and on the main activities.

Activity	**2018**	**2019**	**2020**	**2021**	**Total**	
R&D Projects	5 000	9 000	14 000	14 500	42 500	85%
Core, subdivided into:	1 700	1 800	2 000	2 000	7 500	15%
- Program office	*500*	*500*	*500*	*500*	*2 000*	4%
- Strategy	*500*	*300*	*200*	*400*	*1 400*	3%
- Knowledge synthesis	*500*	*700*	*700*	*800*	*2 700*	5%
- Meeting places	*200*	*300*	*600*	*300*	*1 400*	3%
Total	**6 700**	**10 800**	**16 000**	**16 500**	**50 000**	**100%**

Within the program, three calls for R&D projects are planned:

1. Opens **January 2018**: In the first call, focus will be on shorter pre-studies of up to 500 kSEK and with a duration of up to 6 months. The budget of the call is approximately 5 MSEK in public funding.
2. Opens **September 2018**: In the second call, focus will be on full projects, primarily based on the results of the pre-studies from the first call. The budget of this call is approximately 20 MSEK in public funding.
3. Opens **September 2019**: In the final call, additional full projects are sought, as well as projects that aim at larger demonstrations of results from previous projects. The budget is approximately 18 MSEK in public funding.

9. Contacts

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10. Appendix: Effect Logic

	SoSSUM Activities 2018-21	SoSSUM Targets 2021	Long-term Effects	Effect Target
R&D projects	Each project addresses explicitly, for a selected application: • Urban mobility challenges and trade-offs • Business models • SoS-based solutions • Behavioural adaptations	• At least 8 projects completed • Validated SoS-based solutions for urban mobility (~TRL 3-7) • Practical experience from SoS engineering • At least 10 international publications on SoS applications in urban mobility	• Improved urban transportation, wrt: o Efficiency o Quality o Global and local environment o Safety o Resource utilization	• Liveable cities (societal target) • Environment (FFI target) • Safety & security (FFI target)
Core activities	<u>Program office</u>: • Initiate project calls • Manage project portfolio towards program targets • Liaison to FFI program and related initiatives	• 3 project calls executed • At least quarterly interaction with each project • Regular interaction with FFI organization		
	<u>Strategy</u>: • Monitoring of international urban transportation trends • Interaction with societal stakeholders	• Updated urban mobility strategy		
	<u>Knowledge synthesis</u>: • Collect practical experience on SoS engineering from projects • Monitor international SoS research frontier • Feedback of generic SoS knowledge to projects	• At least 5 international publications on generic SoS engineering • Knowledge basis for future standardization	• World leading SoS engineering capability, with focus on: o Sustainable business models o Architecture and interoperability o Robustness, security, privacy o Socio-technical issues o Processes, methods, and tools • Standardization • Attractive partner in international SoS research	• Industrial competitiveness (FFI target)
	<u>Meeting places</u>: • Organize program events • Organize open events	• Program conference at least annually • One international conference on SoS organized • An active SoS engineering network		