Belief Systems and the Emergence of Advocacy Coalitions in Nascent Subsystems: A Case Study of the European GNSS Program Galileo

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Abstract

The European GNSS program Galileo belongs to the most ambitious programs of the European Community. The project aims at connecting political, economic and technological goals. The several goals of Galileo led to a high number of actors involved, representing politics, economy, and research. These actors follow several different belief systems relying on scientific or economic interests, respectively. The requirements of satellite technology and the expectations to get direct economic values led to coordination problems within the political subsystem. Additionally there were several groups of actors belonging to different modes of transport, supplemented by the scientific developers of GNSS.

Because of the complexity of the actor constellation and the fluid institutional responsibilities this paper uses the Advocacy Coalition Framework to identify actors, beliefs, and potential causes of policy change. The case study focuses on the question how interests and perceptions of latent actors are transformed into policy belief systems and how actors form Advocacy Coalitions in nascent subsystems. It illustrates the major role of beliefs and subjectively perceived information for long-term policy processes.

Zusammenfassung

Das Europäische GNSS Projekt Galileo gehört zu den ambitioniertesten Programmen der Europäischen Gemeinschaft. Die Europäische Kommission verfolgt mit Galileo politische, wirtschaftliche und technologische Ziele. Aus der Vielzahl der Ziele resultiert eine hohe Zahl aktiver und latenter Akteure aus Politik, Wirtschaft und Wissenschaft. Die Anforderungen der Satellitentechnologie und die Erwartungen kurzfristiger wirtschaftlicher Gewinne erzeugten Koordinationsprobleme im Subsystem.

Zur Analyse der komplexen Akteurskonstellation und angesichts der wechselhaften institutionellen Rahmenbedingungen bietet sich der Advocacy Koalitionsansatz an, um Akteure, Beliefs und mögliche Gründe der Programmveränderungen zu analysieren. Die Fallstudie geht von der Frage aus, wie Interessen und Wahrnehmungen latenter Interessen zu Belief Systemen transformiert werden und wie sich in dem entstehenden Subsystem Advocacy Koalitionen bilden. Sie illustriert die zentrale Rolle von

Überzeugungen und subjektiv wahrgenommenen Informationen für langfristige Politikprozesse.

1 Introduction

Galileo is a program to establish a European global navigation satellite system (GNSS) which should allow the European breakthrough in satellite-supported navigation and detection (Weyer 2008). It started in 1995 with the pilot project EGNOS (European Geostationary Navigation Overlay Service). EGNOS consists of tracking stations and was put into operation in 2009.

Galileo is aimed at enabling the independence of Europe from other GNSS systems like the American GPS (Global Positioning System) and the Russian GLONASS (Globalnaja Nawigazionnaja Sputnikowaja Sistema). It should also lead to far-reaching economic effects for Europe and win considerable shares in the worldwide, lucrative market for GNSS applications. The project dates back to the late 1990s and was originally planned to come into operation in 2008. However, in the course of the project delays arose, and the original timetable could not be kept. Currently 2013 is expected to be the earliest start.

The project is not only unique because of its technological challenge. It is also the first intensive cooperation of the European Community (EC) and the European Space Agency (ESA). Another peculiarity is the extensive participation of private actors at the funding of Galileo. The public-private partnership (PPP) became an important foundation of the project.

In 2007 the PPP failed and Galileo underwent a fundamental governance change. Even though there have been some descriptions of this change (Smith 2008; European Court of Auditors 2009) it still lacks explanations of this long-term development.

This paper analyzes the Galileo project using the lens of the Advocacy Coalition Framework (ACF) developed by Paul A. Sabatier and others (Sabatier/Jenkins-Smith 1993; Sabatier/Weible 2007; Weible/Pattinson/Sabatier 2010). The central aim of this paper is to contribute to this discussion as the nascent subsystem Galileo is a case study that delivers evidence concern-

ing the emergence of belief systems and advocacy coalitions and contributing to the understanding of long-term policy change. Thereby this paper on the first view resembles the conditions of another case study questioning the applicability of the ACF to a young subsystem in a volatile context (Beverwijk/Goedebgebuure/Huisman 2008). However, while Bevewijk and her colleagues study Mozambican higher education policy the regional context of the Galileo case is the OECD world.

This paper is organized as follows: The following part discusses if the Galileo case meets the preconditions to use the ACF as a theoretical lens. After presenting hypotheses and methods (chapter 3) the empirical part of this paper describes the development of the Galileo program which is the empirical explanandum (chapter 4). The fifth chapter applies the ACF hypotheses concerning advocacy coalitions to the special situation of the nascent and transnational subsystem Galileo. Afterwards selected hypotheses concerning policy change, power shift, and learning are applied to the case study. The conclusion discusses the evidence of the case study for the foundations and hypotheses of the ACF and names challenges for future research.

2 Galileo as an appropriate case to apply the ACF

The Advocacy Coalition Framework (ACF) has been developed by US American scholars to establish an analytical perspective for explaining long-term policy change. It is based on several assumptions that have been modified in different presentations of the framework. The ACF itself also has been amended several times on the basis of new empirical and theoretical information.

There are however three major preconditions of the ACF that are at least necessary – and probably also sufficient – for using the framework (see for example Sabatier/Weible 2007: 192-198). First of all the ACF assumes that policies are negotiated in policy subsystems. Criterions for subsystems are the existence of specified actors and the relevance of these actors for the formulation of policies. The regular conferences of experts within the Galileo

program prove the existence of actors from politics, economy, science and technology involved in this issue.

In contrast to traditional internal policies like employment, health, pensions, or taxes, the Galileo program lacks specific institutions to frame the policy process. Therefore it cannot apparently be assumed to be negotiated within a subsystem. The ACF, however, defines subsystems less by institutional criterions than by policy arenas though. It thereby introduces peculiarities that focus research to specific aspects of the policy process.

As a first peculiarity the ACFs definition does not relate subsystems to the boarders of states. The original ACF does not demand a national limitation of policy processes but requires geographical boundaries. So the ACF can be applied to policies like Galileo that have been produced in transnational networks instead of a stable institutional environment.

Furthermore, the ACF definition of subsystems demands a long-term perspective. By applying this to Galileo one has to see the program as an enduring issue rather than a single project. Galileo is not limited in time as it is intended to have an enduring operational phase. The time perspective leads us to the second peculiarity: Galileo only started officially in 1998/99, even though first discussions can be traced back to the program EGNOS in 1995. So our case represents a nascent subsystem that enables us not only to analyze the procedures within a subsystem (like most other ACF applications) but also the formation of a subsystem.

To focus on policy subsystems as defined by the ACF implies that specialists instead of generalists dominate the policy process. This idea was originally founded by the US American federal presidential system that built the background of the framework. The American political system is relatively fragmented and therefore policies are regularly decided within “iron triangles” or other networks that only include specialists. European parliamentary systems, on the contrary, decide major policies within party-political arenas that are dominated by generalists. As the Galileo case is not decided within a parliamentarian system it makes sense to assume a dominant role of specialists as assumed by the

ACF. The technical complexity of the issue might also contribute to the dominance of specialists over generalists.

The subsystem perspective furthermore implies the involvement of different types of actors. The ACF does not only focus on genuine political actors or solely on academics for example. If policies are decided by political actors solely, research could apply a theoretical lens that is based on political rationality (for example on the rational goal to win elections).

In the same way one could reject the ACF in cases with opposite conditions: If there is a dominance of a coherent group of scientists that are confronted with indecisive politicians the ACF might be a less appropriate lens compared to the perspective of Epistemic Communities (Haas 1992**)**. The idea of Epistemic Communities stresses the possibility that political decision makers might be influenced largely by scientists under certain conditions: (1.) The politicians to a large degree lack undisputed information, which hampers them in finding solutions themselves, and (2.) there is a powerful scientific coalition that includes (at least nearly) all leading experts. Appropriate conditions can be found in the field of climate change for example. However, the Galileo program lacks the existence of a single leading epistemic community. Therefore we expect to find evidence for policy-oriented learning through scientific information without expecting the dominance of scientists over politicians. In other words: Epistemic Communities might contribute to the understanding of future developments of the Galileo program. Up to now we need another lens that does not require scientific homogeneity. The plurality of actors involved in the Galileo case and the lack of a single Epistemic Community legitimize the focus on policy subsystems.

The second foundation of the ACF can be described as biased perception. Contrary to rational choice approaches the ACF not only focuses on the situation of actors to explain perceptions and policy goals but assumes that stable core beliefs explain the different behavior of actors in similar situations. Core beliefs have a broad scope and are unlikely to change over time. Secondary aspects have a narrower range and are much more likely to change due to new information. This assumption of hierarchical belief

systems is especially useful for analyzing cases that are affected by different interpretations of information.

Originally, Sabatier and his colleagues applied belief systems to environmental policies to explain different behavior of the competing actors. The Galileo project also seems to be an appropriate case for assuming belief systems: The benefits and costs of the project can be seen in very different dimensions (for example in economic, political or technical areas).

The third foundation of the ACF assumes that actors within subsystems join their forces within advocacy coalitions, even though this name-giving foundation of the ACF has not been named explicitly in a recent presentation of the framework (Weible/Sabatier/McQueen: 122). Advocacy coalitions are stable networks of actors with similar core beliefs that coordinate their strategies. The creation, development and structure of advocacy coalitions belong to the major topics of the hypotheses presented by the ACF (Sabatier/Weible 2007 220). The assumption of advocacy coalitions has been challenged however, as it conflicts with the rational choice hypothesis of coalition building by rational individuals (Olson 1965; Schlager 1995). Up to now the state of the art still lacks empirical verification of the ACF's claim and of the rational choice critics. The empirical challenge to prove the emergence of advocacy coalitions is addressed by the ACF hypotheses presented in the following chapter.

3 Hypotheses and methods

The ACF presents 12 hypotheses in its most recent version (Sabatier/Weible 2007: 220). In the 2007 article by Sabatier and Weible the hypotheses are arranged in three parts. Firstly, the authors present hypotheses concerning advocacy coalitions. As argued above, a case study of a nascent subsystem should give special attention on these hypotheses. The other two parts present hypotheses concerning policy change and concerning policy learning. In this paper both groups of hypotheses are not separated as policy learning has to be seen as a major cause of policy change. The original book to present the ACF had the sub-title

"policy change and learning" (Sabatier/Jenkins-Smith 1993). This illustrates the central role of "learning" for the original ACF.

Originally the ACF enabled focusing on two different sources of policy change: power shift on the one hand and policy oriented learning on the other (Bandelow 2006; 2008). The latest versions of the ACF have introduced two more paths to major policy change, namely internal shocks and negotiated agreements (Sabatier/Weible 2008: 204-206). These modifications of the ACF intend to react to criticisms and to include theoretical and empirical elements that are absent in the original version. Unfortunately the modifications reduce the theoretical clarity of the original ACF as the new paths do not distinguish explicitly between learning and power shift. Therefore this paper deliberately ignores these recent modifications of the ACF.

Five hypotheses of the ACF are assigned to advocacy coalitions (Sabatier/Weible 2007: 220). Two of these hypotheses have not been included in the first version of the framework (hypotheses 10 and 11). These new hypotheses focus on the differences of selected groups of actors within the coalitions. They are based on empirical results of case studies and cannot logically be conducted from the foundations of the framework. Both hypotheses can be ignored in the following case study as they have no central theoretical role in the framework and our empirical findings are not suitable to either support or reject the hypotheses.

Out of the three remaining hypotheses, one is related to belief systems while the other two focus on coalitions. Hypothesis 3 actually repeats a major element of the belief system model:

- "An actor (or coalition) will give up secondary aspects of his (its) belief system before acknowledging weaknesses in the policy core." (Hypothesis 3, Sabatier/Weible 2007: 220).

To test this hypothesis it is necessary to define the policy cores of the belief systems. Hypotheses 1 and 2 concern the structure of advocacy coalitions:

- "On major controversies within a policy subsystem when policy core beliefs are in dispute, the lineup of allies and opponents tends to be rather stable over periods of a decade or so." (Hypothesis 1, Sabatier/Weible 2007: 220).
- "Actors within an advocacy coalition will show substantial consensus on issues pertaining to the policy core. Although less so on secondary aspects." (Hypothesis 2, Sabatier/Weible 2007: 220).

Galileo is an appropriate case to apply the hypotheses 1 and 2 to a nascent subsystem. It will be important to see if even under these special conditions the core beliefs and coalitions are relatively stable. Supplementing the existing hypotheses, the case study will focus on the dynamics of emerging belief systems and coalitions. Out of the seven hypotheses concerning change and learning two will be applied to understand the policy change of the Galileo program:

- "Significant perturbations external to the subsystem (e.g., changes in socioeconomic conditions, public opinion, system-wide governing coalitions, or policy outputs from other subsystems) are necessary – but not sufficient – cause of change in the policy core attributes of a governmental program" (Hypothesis 5, Sabatier/Weible 2007: 220)
- "Policy-oriented learning across belief systems is most likely when there is an intermediate level of informed conflict between the two coalitions (…)." (Hypothesis 6, Sabatier/Weible 2007: 220)
- "Problems for which accepted quantitative data and theory exist are more conducive to policy-oriented learning across belief systems than those in which data and theory are generally qualitative, quite subjective, or altogether lacking". (Hypothesis 7, Sabatier/Weible 2007: 220)
- "Problems involving natural systems are more conducive to policy-oriented learning across belief systems than

those involving purely social or political systems (…).”(Hypothesis 8, Sabatier/Weible 2007: 220)

– “Policy-oriented learning across belief systems is most likely when there exist a forum that is
  A. prestigious enough to force professionals from different coalitions to participate: and
  B. dominated by professional norms.” (Hypothesis 9, Sabatier/Weible 2007: 220)

While hypothesis 5 summarizes the ACFs explanations of policy change by power shift, hypotheses 6, 7, 8 and 9 are concerned with learning. Among others, the ACF refers to the type of information provided in order to understand policy change by learning.

The other hypotheses of the ACF are not applied in this study. Hypothesis 4 explains stability of the core of policy programs by referring to a stability of power relations. The formulation of the hypothesis assumes stable political systems. Therefore it is difficult to apply it to the transnational network of Galileo. Hypothesis 12 refers to the role of policy brokers. The identification of brokers remained difficult in the case study. Therefore the study will not refer this hypothesis.

Contrary to other subsystems the Galileo case does not present stable arenas that would enable an easy identification of relevant actors. The policy network has a transnational structure and the responsibility of former institutions changed over time (Lembke 2001; Gleason 2008). So this study could not use formal parliamentarian hearings to identify the subsystem and Advocacy Coalitions. Instead other written statements and existing literature have been analyzed to find actors, beliefs and evidence for evaluating the policy process, the existence of advocacy coalitions, and potential causes for policy change. Additional information has been collected in informal talks with scientists involved in the program and by joining summits of Galileo applicants.

4 Policy change in Galileo

The following chapter contrasts the structure, problems and conflicts of the program until 2007 (for a much more detailed description of the policy process see Gleason 2008). It aims at describing the governance change that was unexpected by several actors and observers.

4.1 Development of a Public Private Partnership 1998-2007

The first period of the European satellite navigation program Galileo begun officially with a Communication of the European Commission in January 1998 (COM(1998)29 final). The formal decision to start the program was made by the Council in July, 1999 (COM(1999)54 final). The Commission received the order to plan the feasibility, efficiency, structure, control, reliability and the costs. The program got a financial frame of 40 million Euro up to the end of 2000. The cost was raised by the ESA with the GalileoSat program, while the EC financed numerous research projects (Hobe et al. 2006).

The Commission presented the results in November 2000. Subsequently the ESA received a service contract with the EU, while the Commission took the political role (COM (2000)750 final).

The negotiations for the further funding of GALILEO started in 2001. The funding culture of the ESA requires that member states receive orders to the same extent as they contribute to the funding of projects ("geographic return"). Therefore the member states had an incentive to contribute as much as possible to the funding of 550 million Euro for the period up to 2005: They could expect to get their money back and could use their financial share to influence the technology in their interest. (Hobe et al. 2006).

Germany, France and Italy all wanted to take the industrial leadership and outbid each other with their financial participation. So the project exceeded the originally agreed sum. The competition also led to open questions about the project leadership and the money backflow. It took enduring negotiations to

find a compromise in March 2003 that gave the project the capacity to act back (COM (2006)769 final). So the project lost over one year compared to its original timetable.

The Galileo Joint Undertaking (GJU) was founded to develop and test the first model satellites and tracking stations. The European Commission had already started first projects within the 6th Framework Programme (FP) to prepare the market of applications (Benedicto/Ludwig 2001).

The original plan of a public private partnership intended the private side not only to build and install the tracking stations and satellites but also to be involved in the funding and take the user's license. The syndicate should assume 1.6 billion Euro of the whole cost of approximately 2.1 billion Euro for the construction. In return it would receive Galileo's proceeds for 20 years (COM (2000)750 final).

In 2004, the first selection procedure identified three possible concessionaires:

- iNavSat (syndicate of EADS, Inmarsat, Thales),
- Eurely (syndicate of Alcatel, Finmeccania, Vici Concessions) and
- Eutelsat (syndicate of Eutelsat, Hispasat, LogicaCMG, AENA).

The GJU started negotiations with these three syndicates in 2004. Eutelsat withdrew in 2005. The other two syndicates presented similar offers, so the GJU suspended the final negotiations (GJU 2005). Thereon the remaining syndicates merged and presented a joint offer in December 2005. Even though there was no competition left, the final negotiations turned out to be full of problematic details:

- How should the financial risk between the syndicate and the EU be distributed?
- How should the orders for the infrastructure be distributed and the subcontracts organized?

– Which should be the role of the public partner for financing safety provisions during the operation period of Galileo?

In the course of the tough negotiations it became evident that the schedule could not be adhered to for the completion and that it was impossible to implement the intended PPP.

4.2 Centralization of the Galileo program since 2007

In May 2007, the negotiations finally failed after the syndicate exceeded the last deadline to sign the concession (COM (2007)261 final). At the same time the timetable had to be changed again. Currently the official plan is for the system to come into operation in 2014, though this plan hardly seems realizable.

This development marks a significant change from a formal PPP to a purely public financed enterprise. Until the end of 2007 the partners negotiated a new form of the project. Finally the program was transferred to a central public form. The GJU was dissolved and the competencies were handed over to the newfounded GNSS Supervisory Authority (GSA). With the resolution EC/683/2008 the EU took over the whole responsibility for the funding of the program. Thereby Galileo became the property of the European Community.

All decisions that have originally been made within a diversified network of public and private actors are now centralized at the European Commission. The Commission has divided the program into working packages like tracking stations, satellites, installation of the system, control etc. to give concrete orders to private enterprises. The advantage of the centralization is that the Commission can control single contractors more efficiently. On the other hand it might become more difficult to coordinate the single working packages. It remains unclear if the hierarchical control will lead to further delays in the time schedule though.

The governance change takes into account that decisions regarding technical solutions reflect the political aims of the EU. The idea to centralize Galileo was developed in 2007 not only because of the problems in agreeing on a PPP. One can find this

goal in older documents like a Green Paper that dates back to 2003 (COM (2003)17 final). The originally intended governance of Galileo brought together actors with several different backgrounds: The European Commission as a supranational organization differs from the ESA. The ESA has an intergovernmental structure that involves not only member states of the EU but also countries like Norway, Canada, and Switzerland. The ESA lacks a clear political mandate and is bound to the interest of the member states. So the development of 2007 changed the governance in three ways:

- The private partners were excluded from the funding.
- The member states were excluded from direct funding by transferring the responsibility directly to the budget of the European Community.
- The program was transformed from a network of supranational, national, intergovernmental and private partners to a supranational hierarchical control.

The described governance change is far from being normal and could not be expected originally. The transformation from PPP to hierarchical control contrasts with other trends of governance. The original governance included several actors with several beliefs. Why have private actors and member states been prepared to give up influence, control and financial chances within the largest project of the EU? The following chapter will discuss these questions from the perspective of the ACF.

5 Belief systems and advocacy coalitions in the nascent subsystem Galileo

As described in chapter three of this paper, the ACF claims that actors within a subsystem do not only follow their interest but rely on a hierarchical belief system (hypothesis 3) and join advocacy coalitions on the basis of relatively stable core beliefs (hypotheses 1 and 2).

The evidence delivered by the Galileo case supports all of these three hypotheses. Concerning hypothesis 1 the peculiarities

of a nascent subsystem are of major importance. Originally, several actors with different interests joined the subsystem: Politicians represented the interest of their states, firms aimed to win shares in a project that was assumed to promise high profit. During the first years the subsystem became even more pluralistic. Military experts and different groups of possible Galileo users joined the subsystem. While the original network has been dominated by developer interests, users originally have been what the ACF refers to as "latent actors" (Sabatier 1987: 659).

In the course of the years, general beliefs have become the decisive conflict line for the formation of first coalitions within the network. The perception of problems and the policy-oriented beliefs depend mainly on the question whether actors see Europe as a partner or as a competitor of the USA (Weyer 2005).

The newly established policy cores within the Galileo subsystem resemble the conflict that shaped the German European policies in the 1950s and 1960s. At that time advocates of close relations with the USA battled politicians who aimed at orienting (West-) German relations closer to France. While the former politicians were named "Atlanticists" the latter were labeled "Gaullists" referring to the name of the French president Charles de Gaulle (Geiger 2008).

The "Atlanticists" of the Galileo subsystem include actors from Great Britain, Germany, the Netherlands, and Sweden. These actors see European space activities in an international context that has originally been part of the competition between the western world and the Soviet Union. The Atlanticists therefore want a close cooperation with the USA.

The "Gaullists" are actors from France, Italy, and Spain. They do not share the Anglo-Saxon tradition that makes the USA a natural partner. Instead they are based on Roman tradition that sees Europe as a region competing with other regions, nations, and empires. The Roman EU member states were backed by smaller ESA (and not EU) member states like Switzerland and by the European Commission (COM (2000)750 final). The conflict between these two coalitions dates back to conflicting strategies for the project in 1999 (Hobe et al. 2006: 144-147). While the

Atlanticists have been important for initiating the program, the Gaullists became the dominant coalition with the subsystem.

The difference of the policy core beliefs within the Galileo subsystems therefore can be traced back to a very traditional deep normative core concerning several general beliefs related to welfare state (Esping-Andersen 1990), general patterns of the economic system (Hall/Soskice 2001) and European integration (Bulmer/Paterson 1987).

As Galileo still is a nascent subsystem not every actor that is part of the recent policy subsystem has been included in the early stage of the policy process. New developments that can be seen as policy-internal or policy-external information activated new actors. These actors partly joined the existing coalitions. The policy core, however, has remained very stable and undisputed within the coalitions so far. Policy change relied on policy-oriented learning that has been biased by the existing core beliefs as will be shown in the next part.

6 Policy change, power shift, and learning in Galileo

The original version of the ACF presents two major paths leading to policy change: external perturbations and policy-oriented learning. Hypothesis 5 summarizes the most common external perturbations (see chapter 3), some of which can only be applied to democratic nation states, like changes of the parties in government. There is only one significant perturbation external to the subsystem that can be identified as relevant for the Galileo program: The 2001 terrorist attack on America directly became a matter for European policies, not only because the terrorists planed their attacks in Europe (BGH 3 StR 139/06). The attacks strengthened the belief that transnational cooperation in security issues is unavoidable. Only three months after the attacks the American Deputy Defense Secretary Paul Wolfowitz formulated worries that Galileo might overlay the GPS military code and therefore the U.S. could try to stop the program (Divis 2002).

The external event 9/11 catalyzed the existing debate within the policy subsystem. The European Commission expressed its

annoyance about the U.S. threat, though it included military questions in the program. In 2002 the Galileo Security Board was established to define technical characteristics regarding security, assisting the Commission in its negotiations with third countries and contributing to the future security structure of the program (IP/02/1358; Lindström/Gasparini 2003: 27). In 2007 the GSA established the Commission System Safety and Security Committee (3SC) and the Security Department.

The developments did not directly change the governance or policies but they changed the actor constellation. Security experts entered the subsystem and became more and more influential. Additionally changes of the U.S. policy concerning GPS reduced the general economic chances of Galileo. The U.S.A. gave up the selected availability of GPS that included less accuracy of civil signals compared to military signals (Clinton 2000; Bildt/Peyrelevade/Späth 2000).

The hypotheses 6-9 name several preconditions that enable policy-oriented learning. All of these conditions are given in the Galileo case. The coalitions have the prerequisites to engage in a debate with each other (hypothesis 6), there is accepted quantitative data (hypothesis 7), the problems involve natural systems (hypothesis 8), there are regular meetings of developers and users that can be seen as a forum for learning (hypothesis 9), and it seems likely that technical and legal information has altered the views of potential policy brokers. So all hypotheses let us assume the case of having policy-oriented learning even across coalitions.

Policy oriented learning is assumed to be biased by existing general beliefs. Therefore different types of actors should rely on different information. The Galileo case presents evidence concerning two types of change, based on policy oriented learning. The first type is the “normal” working of any subsystem. Actors modify secondary beliefs on the basis of policy-oriented information without any significant policy change. This form of learning somehow resembles “first order change” as described by Peter Hall (1993). In the Galileo case, most of this change has been caused by information concerning specific technical and economic applications of the program. This specific information is rele-

vant for both Atlanticists and Gaullists, as it is not directly concerned with the competing general beliefs.

The greatest potential for commercial and public applications has always been seen in the areas of transport and telematics. Approximately 90% of the revenues from licenses were expected to be achieved in this segment (Plank-Wiedenbeck 2005). These applications include vehicle navigation, toll systems, drivers' assistance systems, traffic data elevations as well as logistic uses.

Possible applications include different transport modes like road, rail, air, and shipping traffic. The demands of the transport systems differ though. The expectations of economic prospects changed over time according to information given at the Munich Satellite Navigation Summit 2009. Assistance systems are the most important use of Galileo in road traffic. Galileo is expected to be superior to its American competitor as GPS cannot guarantee area-wide availability, which is why actors from the road traffic group like car manufacturers originally became interested in Galileo. In the meantime improvements in Galileo caused some disillusions in this group. GPS systems are able to use other systems like radio and speedometer to bridge disturbances of satellite reception. Even though Galileo might be technically superior it still is an unsolved challenge to design car applications which are cheap enough to be interesting for the mass market.

In contrast to road traffic, the rail traffic community still expects major potential use of Galileo. Especially the field of train safety is related to precise data that cannot be provided by GPS yet. Rail safety is not only a technical question but also a legal challenge. As there is the risk of major accidents one needs contract provisions concerning guarantee and responsibility questions. Galileo will only be able to provide its quality features, accuracy, availability and integrity, if there are clear guarantee rules. The guarantee problem has not been solved yet despite several negotiations (Smith 2008).

Related to the guarantee problem the insufficient integration of national railway systems in Europe might lead to safety problems. Therefore it will be necessary to include rail safety applications in decisions about the further harmonization of the European railway systems.

Air traffic delivers possible applications of Galileo comparable to rail traffic. The constantly growing air traffic amount requires improved coordination of flight-routes (pilot-services) and better navigation of the airplanes to ensure safe and efficient use of flight space. GNSS systems can provide important data for take-offs and landings and automated aviation independent of weather conditions. Galileo also could provide applications to coordinate landing field and flight field traffic. Similarly to rail applications the major problem is the existing safety infrastructure. Air systems are already integrated in a costly global infrastructure into which new Galileo applications have to be included. Because of the complexity and the awareness of safety aspects in air traffic, safety-related actors in aviation take stock of external systems.

The liability problem in the case of accidents is even more complicated as in the rail case as we have global systems that require transnational contracts. Private actors only have limited chances to negotiate on these contracts. Therefore air traffic applications of Galileo require the political responsibility of the European Union (Smith 2008).

The shipping traffic community expects Galileo to deliver gains in economic services. Especially inland navigation and harbor traffic require exact and reliable data. The existing systems have several technical weaknesses. They are confronted with the problem of multipathing and signal disturbances. So there are economic chances. Applications are confronted with problems similar in rail traffic though. They require harmonization of systems and legal rules concerning liability in the case of accidents.

To sum up, there are several promising applications of Galileo in different areas. The economic opportunities activated actors from different transport areas. These actors have special interest and belief systems. For example, car manufactures are used to include external technology into their projects. They are interested in costs for the customers. On the other hand actors from the air traffic group seem to be much more interested in safety criteria.

The demands of the users have not been taken into account when Galileo was planned technically even though the European Union has tried to include the interest of users by funding application research. The organizational double structure of EU and ESA contributes to the understanding of the inadequate inclusion of users. The EU has become a political system that not only has intergovernmental but also supranational institutions. Therefore it could have been able to consider the cross-national views of applicants. The ESA on the other hand only has an intergovernmental structure that makes it difficult to consider anything other than the political and economic interests of their member states.

Information concerning specific applications explains several changes in the program. It does not directly contribute to the governance change of Galileo. Looking for explanations for the deeper changes within the Galileo program leads away from the technical and economic potential as neither is relevant for the formation of advocacy coalitions. Deeper changes have been caused by information that directly concerned international politics.

Even though formally Galileo remains a civil program the realms of the program have changed (Gleason 2008: 310). The cooperation between the EC and the ESA rules out any military rule. The EC is an economic community that does not include the Common Foreign and Security Policy (CFSP) and the European Security and Defense Policy (ESDP). As a consequence the program lacks any legal basis for military use. Therefore the idea of "dual use" of the program has deliberated at the beginning of the project but it has not been central for the negotiations (Lindström 2002; Logsdon 2002; Geiger 2005: 10).

There were different developments that have led to a revaluation in this case. Most of them match the definition of policy-oriented learning across belief systems given by the ACF. Even before 9/11 the Bush government strengthened the political pressure to their European partner states to include security matters in Galileo. Within the subsystem it was discussed whether Galileo has the theoretical potential for military use. So it is a technical matter if Galileo can be limited to civil use. Especially the problem of potential misuse by terrorists has been discussed within

the subsystem. If there is no technical limit, enemies and terrorists can use the public signals for their own purpose.

Our analysis presents initial evidence for the thesis that policy-oriented information has contributed directly and indirectly to the changes of the Galileo problem. Directly it led to policy-oriented learning of actors within the subsystem. Indirectly new information contributed to the activation of former latent actors. Some actors first entered and afterwards left the system and thereby changed the actor constellation.

7 Conclusion and Outlook

This paper has applied the ACF lens to the European GNSS project Galileo. The application contributed to an understanding and explanation of the governance change of the program. It was argued that general core beliefs shaped the establishment of advocacy coalitions within the subsystem. The coalitions shared general beliefs. These beliefs bias the perception of information. Taking this into account, the change of the Galileo program can be understood by focusing on policy-oriented learning.

Theoretically this case study aimed at testing the foundations and hypotheses of the ACF in a nascent and transnational subsystem. We have confirmed the applicability of the framework to the case. The hypotheses concerning advocacy coalitions also could have been confirmed (hypotheses 1-3; Sabatier/Weible 2007: 220). The same can be said for the hypotheses concerning policy change, external perturbations, and learning (hypotheses 5-9, Sabatier/Weible 2007). Actually the external perturbation of 9/11 contributed to policy-oriented learning within the subsystem. It was this external effect that initiated policy-oriented learning across belief systems of both coalitions. The Atlanticists learned indirectly from 9/11: In the aftermath of the attacks, the USA changed the GPS system and thereby also changed the economic prospects of Galileo. The Gaullists have been affected directly by 9/11: They have learned that political crises can produce demands for an independent European GNSS program under political control.

Even though the case study confirmed the hypotheses concerning policy-oriented learning, the very way learning happens still has to be investigated. This study only presents first evidence for the idea that general beliefs shape the development of advocacy coalitions' nascent subsystems. For transnational policy networks the Galileo case supports the new hypotheses that it is the general approach towards international relations that works as the policy core for emerging coalitions.

This paper is the first step for a theory-driven empirical investigation of the development of the Galileo program. Future research will have to investigate the policy subsystem on the basis of at least semi standardized expert interviews and should use formal network analysis to build a complete model of belief systems and actor relations as it has been done in other recent applications of the ACF (Knoepfel/Kissling-Näf 1998; Nohrstedt 2008; Ingold 2008; Sager/Varone 2009).

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