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TRANSPARENCY IN HIGH RISK ORGANISATIONS: THE CASE OF AIR TRAFFIC CONTROL
A COMPARATIVE RESEARCH IN FIVE EUROPEAN COUNTRIES

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**Abstract:**
This report gives a summary of the main findings of a PhD thesis in sociology, for a non academic public. It addresses first the concept of transparency from a theoretical point of view, and explores its relations with trust. It also gives some results concerning the implementation of EUROCONTROL Safety Regulatory Requirements (ESARR) in the European ATM from a sociological point of view, in a comparative approach which aims to better identify what are the stakes and meanings of “transparency” when dealing with high risk organisations.
FOREWORD

The present EUROCONTROL Experimental Centre Note was devised within the Air Transport Evolution research thread. It is one of several exploratory studies that constitute the foundations of strategic research on air transport evolution. This thread aims to provide material to support the development, deployment and evolution of Agency policies and strategy with an ambition to facilitate informed decisions by policy makers within the Air Transport community.

Safety is a cornerstone in the Air transport industry, recognised to be one of the safest transport modes. With the continuous traffic growth experienced since its beginning, increasing efforts are devoted to maintaining the level of safety in each component of the industry. The complex Air Traffic Management system, that combines technical components, procedures and humans, can be qualified as a high risk organisation. In Europe, the ATM system has strengthened safety through the establishment of the EUROCONTROL Safety Regulation Unit in 1998 and through more explicit safety management. The European Union, with the establishment of the EASA and the Single European Sky regulation endorses and reinforces those dispositions that are an integral part of SESAR.

Safety reporting is an essential component of the safety system in ATM. Given the low number of accidents where ATM is a contributing factor, enlarging its scope to include incidents is necessary to further improve the system and potentially increase the quality of the whole safety management system. Safety reporting includes human reporting, which therefore rely upon the willingness of the operators to report on non-nominal cases or incidents even when there is no legal obligation to do so. The level of such voluntary reporting, that involves notions of trust and culture in different countries and organisations, characterises what some call the ‘transparency’ of the ATM system.

Research on the concept of ‘Transparency’ was performed between 2001 and 2005 in the context of a PhD research in sociology for the CETCOPRA laboratory (specialised in Socio-Anthropology of Techniques, attached to the Sorbonne University-Paris1), in partnership with the EUROCONTROL Experimental Centre as part of the safety research work-programme at its start.

This report is a synthesis of the 4-years research on the concept of ‘Transparency’. It should noted that the content of this report reflects the opinion and the work of the author in support of her PhD thesis dissertation, and does not represent the EUROCONTROL position on these matters.

The research is fed with field work on the implementation of safety reporting systems inside the European ATM during the period, and it widens its reflections to an understanding of the relationship between trust and transparency in high risk industries; this can be transposed to the relationship between Air Navigation Services and the general public.

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EUROCONTROL
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EXECUTIVE SUMMARY

Transparency is a concept in vogue. Referred to on a large scale in the press and political speeches in fields as diverse as finance, health, politics, etc., it is about to become what the Anglo-Saxons call a "buzzword", i.e. a very fashionable term used at every possible opportunity and likely to lose any real meaning. Its very success, however, raises many questions especially when applying to so-called “high risks” organisations where it raises new stakes in the relationships between those organisations and civil society, and in the relations between risky organisations and regulation authorities.

The current research focuses on a very concrete demand for transparency underlying a context of profound institutional change in European ATM: in the late 90s in the EUROCONTROL Organisation, the creation of the Safety Regulatory Commission (SRC), composed of regulators from each EUROCONTROL State and supported by the Safety Regulatory Unit (SRU) attached to the EUROCONTROL Agency, triggered within each State the need to set up regulatory authorities separate from air navigation service providers (ANSPs), such as air traffic control units. In each State, the national "regulator" is responsible for ATM regulatory aspects and for aspects relating to an authority monitoring the operational service provider (which thus becomes the "regulee"). At European level, the Safety Regulation Unit, supporting the European "regulator" (SRC), aims to define harmonised regulations across Europe for all air traffic management authorities: the EUROCONTROL Safety Regulation Requirements (ESARRs).

Under one of the requirements, ESARR2, air navigation service providers (ANSPs) must report any incidents (in the form of annual number, type) and evaluate their severity. The impact of complying with this requirement on operational units in five European ANSPs forms the field study for the present research, which took place between 2000 and 2004. The research used a socio-anthropological approach to explore, through the perception of more than seventy operational ATM professionals in different positions and different countries, the sense such a demand for transparency actually makes. The research supported a PhD for the CETCOPRA laboratory, attached to the Sorbonne; the present report is a synthesis of the PhD report; it attempts to put forward to the ATM community the main relevant findings and reflections on trust and transparency in the particular context of high risk organisations.

Our main findings address the concept of “culture”, and its role and limits to explain differences between the Air Navigation Service Providers. In the following of the Berkeley school in USA on High Reliability Organisations, relations between trust and transparency are also explored. However, when trying to understand the role of specific regulations such as ESARR 2 on the reporting of incidents, it appears that many factors may impact the number of incidents communicated by ANSPs. This calls into question the very concepts of safety "information" or "safety data". Instead of considering the “object” of transparency to be straightforward, our findings argue in favour of a much more complex understanding of what "safety data" or "incidents" really are. This paves the way to discuss some issues related to “safety indicators", in the more general and theoretical framework of reflections on the role and limits of quantitative indicators for complex notions such as safety, when organisations are accountable to other parties of what they do.

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1 European Agency for the Safety of Air Navigation.
2 CETCOPRA is the research laboratory of socio anthropology of techniques in Sorbonne, Paris.
TABLE OF CONTENTS

FOREWORD ...................................................................................................................... V

EXECUTIVE SUMMARY .................................................................................................. VII

1. INTRODUCTION ........................................................................................................... 1

2. A COMPARATIVE APPROACH ................................................................................... 3
   2.1. METHOD .................................................................................................................. 3
   2.2. WHAT IS THE ROLE OF CULTURE? .................................................................. 3
   2.3. A NUMBER OF DIFFERENCES .............................................................................. 4
   2.4. MANDATORY AND VOLUNTARY REPORTING .................................................... 4
   2.5. REASONS FOR (NOT) REPORTING ................................................................. 5
   2.6. THE ROLE OF TECHNIQUE ................................................................................. 6
       2.6.1. A Socio-anthropology of Techniques ....................................................... 6
       2.6.2. The Role of Incident Detection Automatic Tools ......................................... 6
       2.6.3. The Role of Incident Recording Data Bases .............................................. 8
   2.7. EXCHANGING VIEWS: INCREASING REFLEXIVITY .......................................... 8

3. HIGHLY RELIABLE ORGANISATIONS: TRUST AND TRANSPARENCY ............... 11
   3.1. THE HRO THEORETICAL FRAMEWORK AS A STARTING POINT .................... 11
   3.2. SIMMEL: THE ROLE AND LIMITS OF TRANSPARENCY .................................. 11
   3.3. THE ROLE OF "KNOWLEDGE" IN TRUST ......................................................... 11
       3.3.1. Knowledge has Some Importance ............................................................. 11
       3.3.2. What is Knowledge in the Context of Safety? (the Burning Question of "Indicators") ................................................................. 12
   3.4. THE LIMITS OF "KNOWLEDGE" IN TRUST ................................................... 13

4. CONCLUSION ............................................................................................................ 15

5. ACKNOWLEDGEMENTS ............................................................................................ 17

6. REFERENCES ............................................................................................................. 19
1. INTRODUCTION

Transparency is a concept in vogue. Referred to on a large scale in the press and political speeches in fields as diverse as finance, health, politics, etc., it is about to become what the Anglo-Saxons call a "buzzword", i.e. a very fashionable term used at every possible opportunity and likely to lose any real meaning. Its very success, however, raises a question: why is this transparency, which people demand and so often complain is missing, so important? Why has this term emerged? How can sociology clarify the multiple interrelations between this concept and other more traditional concepts (for example power and control), and with a concept which is sometimes seen as its opposite: trust? What are the individual issues of transparency in a so-called "risk" organisation? What is the exact role such transparency plays in establishing or re-establishing trust? Lastly, what kind of social relation do these various equilibriums between transparency and trust represent?

These questions are being asked in a very concrete way in the specific field of aviation and more especially in air traffic control in air traffic management (ATM) organisations. The current research focuses on a very concrete demand for transparency underlying a context of profound institutional change in European ATM: in the late 90s in the EUROCONTROL Organisation, the creation of the Safety Regulatory Commission (SRC), composed of regulators from each EUROCONTROL State and supported by the Safety Regulatory Unit (SRU) attached to the EUROCONTROL Agency\(^3\), triggered within each State the need to set up regulatory authorities separate from air navigation service providers (ANSPs), such as air traffic control units. In each State, the national "regulator" is responsible for ATM regulatory aspects and for aspects relating to an authority monitoring the operational service provider (which thus becomes the "regulee"). At European level, the Safety Regulation Unit, supporting the European "regulator" (SRC), aims to define harmonised regulations across Europe for all air traffic management authorities: the EUROCONTROL Safety Regulation Requirements (ESARRs).

Under one of the requirements, ESARR2, air navigation service providers (ANSPs) must notify any incidents (in the form of annual number, type) and evaluate their severity. This requirement forms part of the development of "feedback" practices which themselves fall within the framework of formalised and explicit safety management systems\(^4\). The impact of complying with this requirement on operational units in some European ANSPs forms the field study for the present research, which took place between 2000 and 2004. The research used a socio-anthropological approach to explore, through the perception of more than seventy operational ATM professionals in different positions and different countries, the sense such a demand for transparency actually makes. The research supported a PhD for the CETCOPRA\(^5\) laboratory, attached to the Sorbonne; the present report is a synthesis of the PhD report; it attempts to put forward to the ATM community the main relevant findings and reflections on trust and transparency in the particular context of high risk organisations, the nature of safety, the role of culture and the role of technical tools versus human beings in the reporting process.

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3 European Agency for the Safety of Air Navigation.

4 As stated in the rationale of ESARR 2 (Safety Regulatory Requirement - ESARR 2. Reporting and Assessment of Safety Occurrences in ATM. 3-11-2000) : "Implementation of consistent high levels of aviation safety and the management of safety in ATM within the ECAC area require, as a priority, the successful implementation of harmonised occurrence reporting and assessment schemes. Such schemes will lead to more systematic visibility of safety occurrences and their causes, and will allow identification of appropriate corrective actions as well as areas where flight safety could be improved by changes to the ATM system".

5 CETCOPRA is the research laboratory of socio anthropology of techniques in Sorbonne, Paris.
2. A COMPARATIVE APPROACH

2.1. METHOD

This research was carried out using a comparative approach by studying five air traffic control centres: Padua (Italy), Brest (France), Bratislava (Slovakia), Valletta (Malta) and Malmö (Sweden). The aim was, by examining current practices, to understand what the impact of these new regulations might be, and what was for different players the specific meaning of requests for transparency regarding incidents and their severity. An ethno-methodological approach\(^6\) combined visits in situ and interviews with the various key players (controllers, supervisors, team leaders, incident analysts, trainers, the head of the centre and staff from the regulatory authorities). This makes it possible to understand what is at stake for the key players as regards incident visibility. These "transparency" aspects are apprehended by putting them back into the context of the comments made by the various players on safety, safety management and the meaning their work has for them. Only this global understanding makes it possible to comprehend what is shown, revealed or dissimulated in each incident.

2.2. WHAT IS THE ROLE OF CULTURE?

The starting point (the operational characteristics of the centres, the development of feedback and safety learning systems, etc.) differs widely from one country to the next. From the outset, EUROCONTROL has referred to "cultural" factors as being likely to have a decisive influence on the acceptability of such regulations with the operational staff. When dealing with such differences, the claim that "it is a matter of culture" is often heard. Do anthropologists and the general public mean the same thing when using this word, however? Do anthropologists and management have a shared understanding of culture? Batteau (2000) answers this second question negatively. How useful is a socio-anthropological approach in elucidating the extent to which culture and other factors lying definitely outside any understanding of culture are involved?

By way of an example of the kind of cultural explanations which may be evoked, the claim is often made that southern European countries are more secretive (and, to put it more bluntly, opaque), while northern European countries are more transparent. Religion is evoked: Protestantism and transparency on one side, Catholicism and secretiveness on the other. There is undoubtedly a grain of truth in this stereotype. To what extent does this actually impact on safety in ATM, however? Is it what Durkheim terms a "pre-notion", i.e. a socially shared understanding which must be discarded if sociology is to have any kind of scientific ambition? A socio-anthropological approach aims to encompass explaining factors at micro- and macro-levels. It also aims to explore to what extent a factor is deterministic. If national culture is definitely a macro-level factor, what other very local factors may also have a very important role? Do high risk organisations, because of their specificities, have any particular kind of approach to and constraints on tackling the transparency/trust question? Does each organisation (each air navigation service provider, or each pair of "service provider/regulatory authorities") develop some kind of particular "organisational culture" that would be far more deterministic than the "national" culture? It may be useful to abandon for a while the notion of culture and to examine the various factors that underlie "transparency" or "opacity" when dealing with safety data.

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\(6\) In each unit, an average of 10 to 15 controllers were interviewed. Interviews were semi directed. Observations have been made during a whole shift in the control room, and the opportunity to have more informal interviews. This was completed by participation to a number of SISG (Safety Improvement Sub Group) meetings, and informal discussions with its members.
2.3. A NUMBER OF DIFFERENCES

The first and main result of our study shows significant variety in practices associated with safety understanding and safety learning processes. We will concentrate here on incident reporting and analysis.

The first and most noticeable difference is the number of incidents declared by each ANSP in the mandatory "Annual Safety Report" required by EUROCONTROL's Safety Regulation Commission. They range from 3 to 17,000 per year. It would certainly appear that "incidents" are not a well-defined category. The term "incident" is indeed defined in a very general manner in ICAO Annex 13 as "an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation." A serious incident is defined as "an incident involving circumstances indicating that an accident nearly occurred."7

ANSPs therefore have some latitude in deciding what they consider to be an incident. More precisely, we have already shown (Fassert, 2001) that more is required than simply deciding what constitutes an incident for an organisation. Incidents are not a "natural category" but rather a social construction in the sense proposed by Ian Hacking (1999): an "incident", or at least the concept of it, is moulded by institutions, procedures, understandings of safety, and systems. This is why, out of the whole set of events occurring in each second in the real world within an air traffic control system, a given number will be "enacted" (labelled and/or identified) as incidents, and this is part of sense-making within an organisation (Weick, 1995).

At one extreme, only airproxes are reported: in this case, the pilots make a declaration and the incident is known by means of an external process that is no longer in the controllers' hands. This will lead to a rather limited number of incidents being declared, where incidents are only those events which are visible to pilots. The number of airproxes declared is itself subject to various influences. Systems, for example, play an important role: the implementation of TCAS some years ago resulted in an increase in the number of airproxes, because it gave pilots additional vision of what was happening around them.

At the other extreme, in other units, controllers are invited to report any event which they consider worth exchanging with colleagues, even if it is not strictly speaking an "incident". This is what is known in Malmö, Sweden, as an "event which you can learn from". In this last case, not only is the number of incidents comparatively "high", because controllers find it normal to report incidents, but also the limit between what does and what does not constitute an incident is now considered less useful in terms of safety learning: one learns from events, whether or not they are labelled as "incidents". Between these two extreme cases (on the one hand the identification of incidents only when they are visible and declared as such by pilots, and on the other the definition of an "incident" as any event judged by a controller to be worth reporting), there is a variety of practices in the various countries examined.

2.4. MANDATORY AND VOLUNTARY REPORTING

In ESARR2, a distinction is made between "mandatory reporting" and "voluntary reporting". Certain incidents are considered serious enough to be mandatory for them to be known about by the entire organisation and by the regulatory authority, while other incidents can be left unreported with no ill-effects: in this case, reporting is purely optional and left at the controller's discretion.

7 "Note 1.— The difference between an accident and a serious incident lies only in the result" (ICAO Annex 13).
In fact, the results show that where controllers are willing to report (for the many reasons mentioned above), they report without considering the "mandatory"/"voluntary" criteria. Moreover, where controllers are not willing to report (for the many reasons examined below), they do not report even incidents considered as mandatory and, in such cases, incidents reported will be restricted to airproxes. Controllers do not comply with the law as an external constraint; they need also to adhere to it. Because they are a group which is structurally "secret" and because it is possible for many incidents to remain known within the "control room" only, they can often choose whether or not to disclose an incident. This is why it is so crucial to reach a better understanding of what induces controllers to report or fail to report incidents.

### 2.5. REASONS FOR (NOT) REPORTING

A set of reasons for not reporting were identified. One of the most important reasons for reporting an incident is the belief that doing so is in some way useful and integrated into a complete safety-management process which gives it value and meaning. One hypothesis is that, owing to the structure of controller teams, where links are very strong and lead to what is identified by Poirot-Delpech (1995) as a "clanic" situation, secrecy is more evident (more natural or normal) than "reporting". Simmel (2000) analyses at length the capacity of secrecy to "link" people together. The control room defines a territory identified by controllers as "their" space; a frontier is established between "us" (controllers) and "them" (management and/or the outside world in general). This opposition seems to vary in strength from place to place; for example, research within the framework of this study suggests that it is less strong in Sweden. For controllers, however, reporting an incident means implicitly giving something (important and valuable) to the outside. Disclosing an incident is neither natural nor the internal group norm for most controllers. It must be for a "common good" (learning from incidents for the benefit of overall safety). If this ultimate objective is not advertised as such by the management, or if it is advertised as such but eventually results in an inquiry in which analysis is replaced by the search for a guilty person, a scapegoat, or if it becomes a bureaucratic process in which the lessons learned for safety are of little interest, controllers will not find reporting valuable. Following Wittgenstein's proposed distinction between "applying a rule" and "following a rule^8", we might say that rather than "applying" a rule (ESARR 2, with its distinction between mandatory and voluntary reporting), controllers continue to "follow" a rule, an internal code.

Safety practices in air traffic control, and specifically incident reporting and analysis, are embedded in the overall life of the organisation. Any ATC centre depends on a whole institution (the air navigation provider, more or less privatised, with its own history), and this institution is itself part of a country. Each case is unique, and in each one micro- and macro-levels of analysis make it possible to understand why "an incident" is a category "enacted" (in the Weickian sense) by the institution (people, procedures, and systems). When aiming to develop a deep understanding of how incidents are enacted and precisely why controllers report or do not report their incidents, culture and, above all, national culture in the traditional and now somewhat old-fashioned sense, is not very useful.

This concept may even be an impediment to further analysis of all the impacting factors and to finding ways in the "here and now" of changing things where they are not satisfactory. We prefer to reject culture as an essentialism which could to some extent be considered as a form of fatalism or an overly simplistic deterministic explanation. A comprehensive approach, allowing a certain amount of room for the reasons and values spontaneously evoked by controllers, allows us to grasp the importance of local organisational factors, which have tremendous importance, and also moral reasons. It also leaves room for organisational and professional culture.

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^8 On the difference between « following a rule » and « conforming to a rule ». The second does not involve the application of a rule as such, but is guided by a sense of what it is normatively right to do". In “Dictionnaire Wittgenstein”. Hans-Johan Glock. Gallimard 2003.
This is also in line with what Batteau (2002) calls for in an anthropological approach to aeronautics: not only, like Hofstede, trying to measure "how much more" culture x is authoritarian, masculine or individualist, but also, and principally, trying to analyse the nuances, the deep significance of authority, etc. Similarly, the aim of the present research is to understand what "transparency" might mean in each case, rather than "to what extent are they transparent?"

However, the concept of culture is still useful when it is used to understand why a concept (such as, in our case, transparency) does not have the same meaning everywhere. In a former Communist country, for example, the “transparency” linked to the implementation of an automated incident detection system triggers a reaction of harsh suspicion. The controller interviewed evokes “Big Brother” and the loss of privacy, and makes a connection to the years he lived in a Communist country. Meanwhile, in a Scandinavian country, “transparency” is a positive concept linked to a voluntary commitment in a context in which many other aspects of political life are also transparent (for example, the Freedom of Information Act, which enables citizens to access large amounts of information).

2.6. THE ROLE OF TECHNIQUE

2.6.1. A Socio-anthropology of Techniques

The last point to be examined concerns not people but systems, and techniques in general. Our approach is also based on a socio-anthropology of techniques, and the recognition and analysis of the role played by technology in what is made visible or not around us. Our aim was also to identify how material aspects (information systems such as databases, automatic detection tools, sheets for evaluating incident severity, etc.), all play a key role with regard to what will be made visible, transmitted, lost or distorted for each separate incident at each stage of the process. In this section, only two examples will be presented. The first concerns the role of automatic systems for detecting incidents, as it crystallises many questions on the links between technique and transparency. The second concerns the role of databases in the coding and recording of incidents.

2.6.2. The Role of Incident Detection Automatic Tools

In order to keep things simple, we have thus far stressed the fact that most incidents remain known only by the controllers involved, and that, in consequence, their voluntary reporting of such incidents is crucial. The situation is actually somewhat more complex. Most incidents in ATC en route control centres like the ones studied here are losses of separation. In most countries, a “Short-Term Conflict Alert” tool is triggered when separation is lost, and alerts the controllers so that they can take the appropriate measures (i.e., a separation clearance to one of the two aircraft involved). This is a controller tool, designed to alert the controllers.

If a system collates these losses of separation automatically, records them, and is able to make them known to other people (supervisor, safety management cell, for example), these incidents are now known outside the control room. They can be analysed, one can choose to listen to the frequencies, to interview the controllers, etc. This choice was made by French civil aviation some years ago, with the ORPHEO system. Another similar solution was applied by NATS in the UK, with the SMF (Safety Monitoring Function), where the system is directly plugged into the Radar Data Processing System, and is parameterised on shorter separation minima (60% of the separation criterion). However, apart from these technical differences, the overall principle and consequences are the same: these separation losses can be known by the organisation, whether or not they have been reported by the controller.9.

9 The way this information is processed and the consequences for controllers are quite different in France (where the reporting of incidents is still left to the controller’s discretion) and the UK (where the controller does not have the choice “not to make a report” when he is “caught” by the system). A detailed analysis of how the social context is moulding the precise use of this type of system is provided in the full PhD report.
In 2001, the EUROCONTROL Agency decided to develop a similar tool, on the basis of the SMF principles. The EUROCONTROL Experimental centre was in charge of its development and implementation at several pilot sites. The first pilot site was Maastricht UAC, the second was Bratislava in Slovakia. The main quite explicit idea was the following: this system will increase the “transparency” of incidents, which will now be visible to the organisation, not just to the controllers or control room. Another more implicit idea dealt with the system’s acceptability: where the controllers already report incidents quite openly, setting up this system will not raise any problems for them, whereas it will of course be more difficult where incidents still remain opaque outside the control room.

Things turned out to be much more complicated. Clearly, in the ATC centres where reporting was not well developed, reference to this system during the interviews is received with suspicion, and raises many questions: who will be entitled to see the information about recorded incidents? Only the supervisor, or people outside the control room? How will this information be processed by the safety management system? And what about the regulator? Will it be entitled to have direct access to the data provided by such systems? What about any prosecutions of air traffic controllers in the countries where this is possible?

Behind these questions on the system-related procedures, a more fundamental issue was raised: what meaning can be given to such mandatory and automatic transparency? If we refer to the meaning of transparency (based on Allen Batteau’s understanding of culture), then it is clear that “transparency” means different things in different places. Hence, in each place “automatic” transparency will be interpreted according to the particular context. Very quickly, the term “Big Brother” was used by air traffic controllers. And this was particularly strong in Eastern Europe, where some controllers cited the Communist regime of recent years to explain their reluctance to use this kind of tool. Within EUROCONTROL, some defenders of automatic detection tools have claimed that, in ANSPs where reporting by controllers was well developed, this kind of tool will not raise any opposition. This is too simple a view. For example, in Sweden, an operational manager expressed concern about the message that the implementation of such an automatic system might send to controllers. To summarise: “It would mean that the management does not trust me (any more) as a controller”. If it is recognised that controllers spontaneously report incidents, as was clearly stated in our comparative approach, what is the point of making this “automatic” (i.e., no longer dependent on a voluntary attitude)? The same person adds “(this automatic system is the opposite of what we are”). This strong statement shows the extent to which the ASMT is seen through its symbolic aspects (what it evokes in terms of surveillance, monitoring of people and not only of things, incidents) - much more than through its functional aspects (facilitating the recording and replay of incidents). 10

“Transparency” means different things depending on the context. If transparency exists in Sweden, it has a kind of moral dimension, it is a voluntary commitment made in a context where many other aspects of political life are also transparent (for example, the Freedom of Information Act, which enables citizens to access a good deal of information). It is much too simple to think that “transparent” countries or organisations would see an “automatic” transparency as nothing more than making something voluntary automatic. And this is completely different in the Eastern European context, where transparency is linked (in the present post-Communist context, which may also evolve over the years …) to involuntary transparency, to surveillance, to “Big Brother”…

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10 The functions that facilitate incident analysis, and the fact that, in some parametrisations, automatic safety monitoring tools have the quite interesting function of being able to record events like level busts that cannot always be perceived by the air traffic controller are often disregarded by most people in their initial judgment of the ASMT. A more complete approach to the ASMT issues can be found in C. Fassert. “La transparence en questions, le cas du contrôle de la navigation aérienne” and Fassert and Joyce « ASMT operational issues », both accessible on the EUROCONTROL Website. The PhD Report (to be published in French) also addresses the more « successful » implementation of other automatic safety monitoring tools in the UK and France and again stresses that the social context and local organisational features play a key role in the final use of such systems.
To return to our initial question about figures on incidents, the reader might already have guessed that ANSPs which have a very high number of incidents are those equipped with an automatic detection system ... At the beginning of the exchange of data on incidents (2001), the representative of a Western European country in the Safety Improvement Sub Group (SISG) told me “OK, our figures on incidents seem very high ... but we have an automatic detection tool, I suppose EUROCONTROL is aware of that, well, I hope so...”. (He is still not so sure of this ... he is not so sure that a high number of incidents will not be seen as a low degree of safety). One year later, listening to the incident figures provided by the NATS representative during a SISG meeting, the same representative seated next to me made some quick calculations on paper and said “Well, looking at their figures, taking into account the number of movements they have, we have roughly the same number of incidents ... that is normal I guess, we have the same tools, and the same degree of development ...”. What is striking is that he does not say “We have the same level of safety”. We will return to “safety indicators” later. We may keep in mind at this stage that safety indicators are for the moment a good indicator of ... the development and sophistication of the Safety Management System ...

2.6.3. The Role of Incident Recording Data Bases

Regarding the role of databases recording incidents and other so-called “safety events”, our remarks follow some of the remarks already made in safety engineering literature. (Barriquault and Amalberti, 1999), and our findings are fully in line with Barriquault (2005) Barriquault has shown convincingly how these systems often filter out information which is very useful for safety learning and feedback. So, the point is stressed here mainly in the light of our general question about “what should actually be transparent as regards safety data”, which means, to some extent, really questioning what is the “information” that is made visible by an ATC service provider. In our field research, the opportunity to “track” an incident from its initial declaration by the controller to its recording and final reporting to the regulatory authorities shows how a very detailed story (the whole story-telling of an incident) is eventually reduced at the end of the process to a general "cause" which may not be the most appropriate way of recording those features of an incident which need to be recorded. Some very interesting information (present in the initial story, and accessible through the interviews with the controllers), without any doubt of the utmost importance for organisational learning, is progressively distorted and lost as the incident is written, analysed, encoded, transmitted, and finally recorded in a specific format into the database. The role of technique (here, in particular, the design of the database, and the features it may or may not provide) is of tremendous importance in the construction of an understanding of safety issues. The exchange of information between national databases and the building of a "European" database are sometimes advocated as an ultimate solution for transparency on safety data ... But this very much raises the question of the status and usefulness of information exchanged in this case.

This calls into question the very concepts of safety “information” and “knowledge”. Instead of considering the “object” of transparency to be straightforward, our findings argue in favour of a much more complex understanding of what "safety data" or incidents really are. This question is discussed in greater depth in paragraph 3.3.1.

2.7. EXCHANGING VIEWS: INCREASING REFLEXIVITY

In a more opportunistic way, the present research has also benefited from the author's attending a number of meetings of a working group which was being set up as the research started. The SISG (Safety Improvement Subgroup) set up by EUROCONTROL is a working group comprising the safety representatives of all the EUROCONTROL Member States; it meets every six months. One of its mandates is to allow exchanges of information concerning incidents which have occurred, and to work out a common method for evaluating incident severity; this method may in the long term become one of the acceptable means of compliance for incident notification required by ESARR 2. Following the meetings and work of this Group as an observer was a unique opportunity to observe the work on constructing and understanding safety, and the debates, exchanges, and
disagreements relating to that concept. This was in fact one of the first occasions when there had been such European-level exchanges on national safety practices, which had up to this point remained cloistered and little questioned. While, for some ANSPs and their regulatory authorities, this "only" involves communicating to a European authority information already collected at national level, others actually aim to set up feedback practices which are currently lacking or even non-existent. Even where such practices exist, however, unifying them will not be without difficulty, since unequivocal and universally accepted definitions of the terms "incident" and "severity" do not exist. One of the most important effects will therefore be the denaturalisation\(^{11}\) of the concept of "incident". In sociological terms, this may be described as the passage from an "epistemology of realism", in which the incident is a "given", to a more constructivist vision integrating micro- and macro-social elements which determine what the organisation deems to be an incident, and this leads to a gradual calling into question of the practice of using the number of incidents as an "indicator" of safety.

A related change concerns the increased reflexivity that these kinds of exchanges brought to the participants. This may not be the least of the side effects of the implementation of European regulations. And maybe this increased reflexivity encouraged by comparisons and confrontations between safety managers will ultimately be one of the most positive effects of European safety regulations.

\(^{11}\) A “natural category” is given by nature itself, and not by human thought. Many categories that we find “natural” are rather “cultural” or socially constructed. Ian Hacking (seminar of Collège de France, 2005) tries to demonstrate that there are no natural categories. Without taking such a strong position, our work was greatly influenced by the ideas of the author of “The social construction of what”. In our field study, we show how many ATM services providers did not have the opportunity to exchange their views before the setting up of the SISG group. So, each of them has the feeling that their way of defining what was an incident was “natural”. Then they realised that an event which is here an incident is not an incident in the neighboured country. This was even more striking for severity : the severity of an incident is evaluated differently here or there. “Denaturalisation” means here that the participants realise little by little that what they found “natural”, “evident” is in fact the result of history, culture, technique, etc. In this context, we argue that it is no more important to decide who has the “right” or “true” definition of incident, the good question is “what definition of incident allow us to do properly our safety learning ?"
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3. HIGHLY RELIABLE ORGANISATIONS: TRUST AND TRANSPARENCY

3.1. THE HRO THEORETICAL FRAMEWORK AS A STARTING POINT

As a general rule, the question of transparency vis-à-vis the public or a monitoring authority is particularly pressing for so-called "at-risk" organisations. In the context of "high-reliability organisations", La Porte puts forward a number of ideas which constitute a starting point for our research. His aim is to produce a theory on the specific organisational characteristics of such organisations and to understand how they can maintain and build their institutional constancy and sustained legitimacy over time, in order to deserve citizens' trust (trustworthiness). This involves in particular comprehending the mechanisms which constitute "accountability" (this concept is not easy to translate; it means that an institution has "to give an account" of its actions, and is also much broader than the French term "responsabilité", which is sometimes proposed as a translation). While recognising that few studies have made the effort to understand the mechanisms which produce trust in an institution, he nevertheless prepares the ground. One aspect of this is that an important place is given to the concept of transparency, internally and vis-à-vis the outside world. Thus, with regard to the organisation's working procedures, he summarises the situation as follows: the maxim that "the less one knows, the better off one is" has to be reversed. He advocates in particular the development of "self-evaluation procedures, internal critical assessment procedures, and clear designation of those responsible institutionally". This internal transparency must ultimately permit a form of external control: "These requirements indeed make the operation of the organisation more transparent to the interested parties, who are often concerned and sometimes hostile". La Porte remains cautious, however, with regard to the exact influence of these mechanisms, and concludes as follows: "not enough work has yet been done for it to be possible to recommend strategies to reverse certain tendencies towards mistrust". The approach of La Porte has the merit of basing the role of a form of transparency on the establishment or rebuilding of trust. However (and this is a view advocated by La Porte himself), this is the starting point of numerous questions to be explored rather than an end result.

3.2. SIMMEL: THE ROLE AND LIMITS OF TRANSPARENCY

A first question concerns the actual link between transparency and trust. The latter cannot merely be reduced to the former. According to Simmel's elegant formula "trust is an intermediate state between knowing and not knowing: a person who knows nothing cannot reasonably trust, and a person who knows everything no longer needs to trust". To reformulate this in more up-to-date terms, although a certain amount of transparency is necessary for the establishment of trust, total transparency creates a relation which no longer involves or requires trust. Following Simmel's line, Quéré adds that trust has a cognitive aspect, but that it is not in essence cognitive. But before exploring these "non-cognitive" aspects, it may be of interest to consider what exactly is meant by "knowledge" or "information" in our specific case.

3.3. THE ROLE OF "KNOWLEDGE" IN TRUST

3.3.1. Knowledge has Some Importance …

If one re-examines the Simmel formula step by step, it is possible to posit initially that exploring the relations between a risk organisation and its environment involves ascertaining the "necessary information quantum", to quote another of Simmel's formulae, for the introduction of trust. Over and above the information quantum, one must also ascertain the nature of such information: Simmel says that it is "culture" which made it possible to determine what needs to be known in order for trust to exist. It is based primarily on examples of interpersonal relations, which do not exhaust the

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12 This development in the sociology of organisations is proposed by the Berkeley school (La Porte, Rochlin, Roberts, etc.), whose adherents advocate that the study of highly reliable organisations (i.e. those which are at risk but nevertheless able to maintain a high level of reliability) requires a specific theoretical framework.
question of trust in an institution, since such trust cannot purely be derived from relations established between individuals (Quéré, 2001), and Seligman (1997). Moreover, “culture” implies the idea of duration and of history, which does not tell us a great deal about relations which are recent, such as those between a regulatory authority and an ANSP, etc. The question remains unanswered and somewhat urgent.

3.3.2. What is Knowledge in the Context of Safety? (the Burning Question of “Indicators”)

If one further explores the “cognitive” aspect, one question very directly concerns the exact nature of the information being provided and the function played by it in the social relationship being established. What is the “nature” and “quantum” of safety information I need to know in order to trust an ANSP? We have already said that safety “information” cannot be considered a straightforward object that merely needs to be made visible, or revealed. The nature of information or knowledge is a tricky epistemological question, which is more fully addressed in the full PhD report. Our aim in this report is simply to make a few simplified remarks on this complex issue.

Let’s start with a common-sense reminder: “Safety” cannot be viewed as a simple object. So, any attempt to be “transparent” on safety will imply some mediation. The provision of information between an organisation and the bodies responsible for controlling it (in the broad sense) increasingly takes the form of indicators, the aim of which is to allow amongst other things a comparison between different entities (States, organisations, companies, etc.). The same trend of trying to identify a safety indicator (or, at least, several indicators that would constitute a good picture of safety) is being followed in the field of air navigation.

If safety was a physical concept (like, for example, temperature), the problem would be simpler: you would have to find an instrument that faithfully measures temperature. This does not mean that there is not some kind of convention: people one day decided that 0° Celsius would correspond to water freezing, not to the freezing of any other liquid, and this is now considered “normal”, the natural way to consider temperature. But still, temperature is something straightforward, it is now unquestioned, at least for our current paradigms; although the “convention exists, people who measure temperature in Celsius find it rather strange that other people measure it in Fahrenheit, and vice versa .....

When looking at the difficulties involved in measuring safety, it is therefore more useful to look at the difficulty of measuring any complex notion. Let’s consider, as a good example, the debate on “wealth”. The economists of the so-called “conventionalist approach”, (Gadrey and Jany-Catrice, 2005) and the statisticians of the conventionalist statistical approach (Desrosieres, 1992) argue that indicators are “forms of knowledge that depend on political conventions and systems of values” The latter may be stabilised for a while and subsequently questioned, but they are always linked to debates, deliberations, and disputes. That is why, as it is explained very clearly by Gadrey and Jany-Catrice (2005), there may have been historically an agreement on the use of GDP as an accurate indicator of wealth and progress in a society, but debates then progressively claimed that the use of GDP was now insufficient or inadequate to measure progress and well-being. Alternatives along these lines have been proposed, one of the most well-developed being at the UNDP by Amartya Sen and Martha Nussbaum with the HDI (Human Development Index), which adds life expectancy and the level of education to the initial GDP. We will not go into detail, of course, on the debates provoked by this index, the philosophical grounds and its critics. Our aim is only to stress how finding an indicator for a complex concept is always a question of debate, values, and negotiation.

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13 The history of the relations between “regulator” and “«regulee»” exists but is short and highlights in particular a number of failures: see Vaughan's analysis of the relations between NASA and the monitoring authority following the Challenger disaster. There is also Consolini and Rochlin's analysis of “regulation styles”. And their impact in terms of relations between the regulator and the “«regulee»”. More recently, Claudia Humbert (2004) in the field of nuclear energy in Switzerland paves the way for an alternative to traditional regulation methods. Such knowledge is still very scarce and incorporated very unequally by the actors in the risk system. Moreover, this, is far from constituting what Simmel, and sociologists in general, would term a “culture”, as his examples of how one progressively adopts the “nature” and “quantum of information” are based on practices that are deeply ingrained in people’s habits, and virtually naturalised.
On the other hand, when listening to the debates on safety indicators, “objectivity” is one of the terms most often heard. As if there was “true” safety for each ANSP, and the aim was to find the best instrument to measure it. But in fact, “true” safety does not exist more than does “true” wealth or well-being … However, with the constant reference to “objectivity”, there are few “official” debates on what safety really is, or on how the indicators might actually be useful for making decisions where an indicator varies …

The actors (the safety managers), unaware of what model will be used to analyse their safety figures (is one "safer" when one has fewer incidents or when one has more? If it is OK to have some in order to prove that you are not completely blind on your safety problems, how an increase will then be interpreted? etc.), are often reluctant to communicate them. Remember here the question of the French representative quoted in paragraph 2.6.1. “OK, our figures on incidents seem very high … but we have an automatic detection tool, I suppose EUROCONTROL is aware of that, well, I hope so …". It is now commonly (but always implicitly) recognised that a very low number of incidents is not a sign of excellent safety … But the “model of interpretation” of safety incident figures has still not been clearly and explicitly established either. Our hypothesis is that the adoption of regulations and the resulting demand for indicators from the various ANSPs has led to a degree of doubt as to “what this figure on incidents means?” This calling into question does not follow a linear or evolutionary path. One safety comprehension paradigm does not simply succeed another - assumptions and simple ideas are questioned throughout the discussions. During SISG meetings, it was clear that the category of "incident" was gradually denaturalised as a result of the exchanges, without any new convention being properly established between the actors, in the absence of a genuine deliberation process. The last PRU (Performance Review Unit) report recognises that the number of incidents is very different from one ANSP to another, and that no conclusions can be drawn. This is quite an evolution insofar as, in recent years, reluctance by ANSPs to communicate their incident figures was always interpreted as pure “opacity” and condemned as such … However, in the current situation, the models linking the concept of "incident" to that of "safety measure" remain to a large extent implicit, and new conventions making it possible to construct the agreement have still not been fully and officially discussed.

3.4. THE LIMITS OF “KNOWLEDGE” IN TRUST

Now that the role and limits of “information” in the building of trust have been explored, we still have to dissect the other side of Simmel’s statement that we offered to take as a structure for our analysis. Indeed, the other side of the question as formulated by Simmel warns us against an overly simple vision: "he who knows all no longer needs to trust ". If one explores the "moral" aspect proposed by Simmel, then trusting does not mean "knowing everything". Consequently, what is the exact nature of the trust one has in an organisation or in any institution in general? Trust cannot therefore be reduced to such cognitive aspects, to a quantity and a type of information which has to be made visible, whether by means of indicators or other means. Following Simmel, Quére argues that "trust has a cognitive aspect, but it is not in essence cognitive". Because it includes a form of commitment, he maintains, it has a moral aspect. Similarly, the concept of "trustworthiness" (for an institution, deserving people’s trust) is indeed a moral question which goes well beyond its simple willingness to provide information.

The question of trust in institutions in our world is a vivid and broad question. Only a certain number of aspects can be summarised here. Giddens (1994) underlines the specificity of modern societies in comparison to traditional societies where trust was more "territorial" and linked to a rather small group of people (our community). He stresses: "With the development of abstract systems, trust in impersonal principles as well as in anonymous others, becomes indispensable to

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14 At a Safety Improvement Sub Group meeting (a group of safety managers from various ANSPs, set up by EUROCONTROL), a safety manager reported an “increase in the number of incidents in the previous 6 months”. This received reprobation and “ooohs” from some other members in the meeting. The safety manager reacted strongly: “I am disappointed by your reaction! You are reacting like management people (sic). We have more incidents because we have more incidents reported by controllers, and that’s fine … we have put in place some runway incursion awareness measures, for example, and we now have more RI incidents reported than before …".
social existence.” Fukuyama (1995) differentiates between societies where trust is in general "low" or "high" and, in this connection, Stompska (1999) thinks that society may develop in each of its members a faculty of trust; there are, in his view, "cultures of trust" that are still missing, he argues, in post-Communist countries. (Remember our Slovakian example).

What is, lastly, the role of the “imaginary”?15 This question is transversal to all researches carried out at CETCOPRA. Aviation holds a place in people's “imaginary”, composed partly of knowledge (what we know of the history of aviation, of its heroes, of its institutions, what we know about manufacturers, airlines, etc.) and partly of what goes beyond knowledge (what it evokes in terms of myths and dreams: Icarus's dream being one of the most famous examples). Having trust in an institution, and in the fact that an institution "deserves" such trust, therefore remain questions which go far beyond the commonplace communication of "information", although this is part of it.

This allows us to re-posit the problem of transparency. Monique Canto Sperber (2003), invited to reflect on the concept of financial transparency, raises the question of transparency from the point of view of the persons subjecting themselves to it. Does such subjection imply "simply respecting procedures" or, on the other hand, "sincere obligation" on the part of the "controlled party"? It is of course to this second attitude that one implicitly refers when one speaks about transparency. In virulent criticism of the demand for transparency in all its forms and of transparency-derived forms of management in Great Britain, Onora O'Neill (2002), a moralist philosopher, in the same vein as Canto Sperber, bluntly concludes that "the opposite of transparency is not secrecy, but deception."16 She also points out something very fundamental for our own understanding of the “transparency” issue in air traffic control: the objectives of any organisation are so complex that they cannot be reduced, in an analytical manner, to what is “measurable” and generally quantifiable.

Lastly, it seems that if one looks at the issue from the point of view of the mediation of transparency, one needs to add to these remarks the question of the legitimacy of the "controller" (for instance, in the case of air navigation organisations, the legitimacy of the regulatory and supervisory authorities being set up at national and European level). Traditional ideas on legitimacy (from Weber right up to Habermas today) find fertile ground here17.

This long parenthesis in the form of reflections on trust allows us to re-integrate two dimensions on transparency: a moral dimension, without which it is likely to sink into management excesses in which information becomes an end in itself (Breton, 2000) and the concept of mediation. This massively complicates the notion of transparency, implicitly held by many, as simply a revelation of reality.

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15 This is translated from French where the socio anthropological concept is based also on an adjective taken as a noun : “imaginaire”.

16 O'Neill does not reject the idea of "accountability" in its moral dimension (the notion of being called to account for our acts to our fellow men, including the institutionalisation, in some cases, of this), but rather criticises an administrative vision which focuses on the ever-increasing production of information. She calls for "intelligent accounting", of which she merely traces out the general outlines (the idea of calling for judgment beyond the purely information-based visions which too often prevail). This intelligent accounting still needs to be invented for relations between regulatory authorities and service providers in the field of air navigation.

17 Readers interested in the concept of legitimacy will find developments in the full PhD report, not yet published.
4. CONCLUSION

This research can be regarded as a critical continuation of the work of La Porte on the concept of "trustworthiness" and his ideas on what enables a risk organisation to retain its long-term legitimacy. La Porte endeavours to determine the mechanisms which make it possible to provide information, organise visibility vis-à-vis hostile entities or at least those that are wary, and lay the foundations of the possible construction of trust on this basis. It seems however that his implicit interpretation of trust is essentially cognitive, even though one can read in veiled terms in his work a marked sensitivity to what Trosa (2005) calls the "ethico-civic" dimension of Anglo-Saxon "accountability". This is why these ideas deserve to be extended and supplemented in order to broaden this essential concept of sustainable legitimacy of the risk institutions at the heart of our modern societies.

Simmel's reflection allows the exploration of both aspects of trust, which we might, in order to simplify matters, call the "cognitive" aspect and the "moral" aspect. It proposes an architecture which shows how two aspects of a question can differ and how each one can have its own concepts, but the two can still be linked and subject to tension: with this concept of an "intermediate" state, Simmel stresses the dynamic nature of this concept of trust, its oscillation between knowing and not knowing, knowing and faith, cognition and morals.

First, as regards the strictly "cognitive" aspect, there is a need to analyse the role of mediation, i.e. of the possible contents of such information, and of everything that allows such mediation to be established. This mediation in a technical field will still be more or less quantified. This quantification most often takes the form of indicators. However, although sometimes presented (or at least "naturalised" gradually over time) as objective measures of reality, they still in fact reflect conventions and standards. To date, these conventions and standards have not really been the subject of a genuine debate because, if the underlying hypothesis that "Safety is a reality simply to be measured" is now gradually called into question, no other interpretation has been institutionalised yet. The deliberation process around this question is a mix of cognitive, rational issues and of political issues on the legitimacy of the different institutions (ANSPs, safety groups, SRC in EUROCONTROL) to decide how to measure safety.

It is also important to recognise the limited role to be played by indicators, and it is time to find additional efficient ways to screen safety operations. Ways that recognise the multiplicity and complexity of the object "safety", ways that respect the «regulee»’s responsibility for safety, ways that guarantee surveillance that has an actual added value for the safety management set up by the provider, and for the local balances that are, day after day, created by all actors. These questions might be more urgent than attempting to find the "right" numerical indicators - this is at least one of the conclusions of this research. In the Nuclear domain, there are some first reflections on how to regulate more "smartly" safety operations : we propose to coin them as "bureaucratisation avoidance" … Claudia Humbert, in Switzerland, for example, advocates a more "ethnographic" approach to regulation, where regulators screen operations and safety management processes in such a way that it seeks to avoid pure paper work, a reproach which is of course widely spread in such tasks18. 

There is, lastly, a paradox to be noticed here. The work comprising an attempt to identify indicators (i.e. to elucidate what is measured, to find an agreement, to debate all this in a collective process, …) is also an excellent starting point for improving reflexivity, because it will force the actors to elucidate some very tricky points that are often forgotten, and to abandon a too-easy reference to "objectivity". But this implies a truly deliberative process, involving different points of view, sometimes mutually irreducible.

18 In a study of the finnish regulator in the nuclear domain, Teemu Reiman and Lena Nooros (2002) show the discrepancy between the perception that regulators have of their work (to be a warrant of safety, struggling for this (noble) high level objective) and their actual day to day practices that they find desesperately bureaucratic. This process evokes of course the prophecy of Weber in our modern societies … But, more optimistically, it shows also that actors are still struggling for finding a sense to their activities.
As for the moral aspect of trust, this needs to be broadened to encompass the non-cognitive aspects by recalling with Quéré that “trust has a cognitive aspect, but it is not in essence cognitive”. In this context “transparency” is also moral in nature because it has the symbolic value of “giving account”, of being able to answer questions about one’s acts and practices, especially when those practices, undertaken within a so-called "risk" organisation, affect the lives of our fellow men.
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6. REFERENCES


Reiman, T. and Nooros, L. Regulatory culture, a case study in Finland. IEEE 7th Human Factors meeting. Scottsdale, Arizona, 2002.


