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## Executive summary

The notion of independence, as commonly used, is somewhat fuzzy. Some public bodies, such as the Federal Reserve System in the United States or the European Central Bank are independent. The Court of Justice of European Communities is also an independent and autonomous institution. These institutions have characteristics consistent with the formal definition of the notion of independence. They are independent, in the limits of their missions, because they are not subject to outside control. They are separate and do not take instructions from other public bodies. They are financially autonomous and the members of these institutions themselves are qualified and independent.

In relation to the field of research, the meaning of independence does not seem excessively problematic. As for the central banks or the judicial institution, a certain amount of independence –independence of the entity, that of the researchers and of the research itself– would be vital for the impartiality and the quality of the research process and its results. Therefore, an independent accident investigation body should not be subject to outside control in the pursuit of its mission. It should be separate from other bodies, public or private, having financial or other interests in the results of its investigations. It should not take instructions from other bodies or outside personalities. It should have adequate control over the use of its investigation results. Finally, it should be financially autonomous and its members be qualified and independent themselves.

In the United States, the contrast between National Transportation Safety Board and National Highway Traffic Safety Administration is most interesting. While NTSB has a solid reputation as an investigation body, wearing several hats puts NHTSA in a somewhat uncomfortable position. In that particular case, the main problem seems to arise from the ties it has to the manufacturers as the authority responsible for the safety regulations and for the safety investigation.

In Europe there are several Directives or Regulations, as well as a White Paper, a Communication from the Commission and a Work Programme, that concern transport safety.

In the field of civil aviation, there are two *specific* European Directives:

1. *Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents; and*
2. *Directive 2003/42/EC of the European Parliament and of the Council of 13 June 2003 on occurrence reporting in civil aviation*

The purpose of a safety (or accident) investigation, the authorised methods and practices, as well as the definitions have been set by the International Civil Aviation Organisation (ICAO) since the 1944 Chicago Convention. Accident investigations in Europe and worldwide rely on the Chicago Convention Annex



13. The first version of the Annex 13 was drafted in 1951; the current version (9<sup>th</sup>) was agreed upon in 2001.

The European Directives' focus is on the structural, financial and functional independence of the investigating body. National laws adapting the international and European requirements concerning the independence of the safety investigation and of the investigation body exist in all studied Member States, namely in Germany, France, Italy, Finland and United Kingdom. All these Member States have an independent civil aviation accident investigation body.

In the field of maritime transport, there is one *general* European Directive:

1. *Council Directive 1999/35/EC of 29 April 1999 on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high-speed passenger craft services*

The purpose of a safety (or accident) investigation, the methods and practices, as well as the definitions have been set by the International Maritime Organisation (IMO). The accident investigation in Europe and worldwide tends to respect the IMO Code for the Investigation of Marine Casualties and Incidents, agreed upon by the Resolution A849/20 from 1997.

The European Directive structures the maritime transport in a quite general manner. It is not specific to accident investigation and does not require the Member States to establish an independent investigation body. However, the Directive's aim is to ensure the harmonised enforcement of some principles agreed upon within the IMO, particularly the IMO Code for the Investigation of Marine Casualties and Incidents. The IMO Code states that *ideally* an investigation on a marine casualty should be separate from, and independent of, any other form of investigation. Therefore, while the Member States have no formal obligation to establish an independent investigation body for the investigation of marine casualties, this remains an objective. National laws adapting the international and European recommendations concerning the independence of the safety investigation and of the investigation body exist in Germany, France, Finland and United Kingdom.

In the field of rail transport, there are three *general* Directives:

1. *Council Directive 91/440/EEC on the development of the Community's railways amended by the*
2. *Directive 2001/12/EC of the European Parliament and of the Council of 26 February 2001; and*
3. *Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railways*

The purpose of a safety (or accident) investigation, the methods and practices as well as the definitions are set by the 2004 Directive. It requires the Member States to establish an independent accident investigation body. The European Directives' structure the rail transport in a quite general manner. The International Union of Railways (UIC) uses the European definitions for its



Safety Data Base project. National laws adapting the European requirements concerning the independence of the safety investigation and of the investigation body exist or will shortly be acted in all studied Member States.

In the field of road transport, there are no European Directives or Regulations nor any other international legal framework. National laws on safety (or accident) investigation and the investigation body exist in France and in Finland.

Italy, Germany and United Kingdom have opted for separate investigation bodies for different transport modes. France has opted for separate investigation bodies for civil aviation and maritime, while all the land transports are investigated by one body. Finland has an investigation body for civil aviation and all major accidents, whether they involve a mode of transport or not, and another system for investigating road and cross-country accidents.

It is clear that road accident investigations differ from the accident investigation in other transport modes. Only two of the Member States, whose accident investigation practices have been assessed, have a legal national framework applicable to road accident safety investigation. In France, the decision on opening a safety investigation on a road accident is taken by the Minister of Transport. In 2004, only three accidents involving road traffic vehicles were investigated. In Finland, all fatal road accidents and some non-fatal road accidents are investigated. On average, some 500 road accidents, of which 370 fatal, are investigated annually.

The bulk of the research in road safety in all involved Member States, with the exception of Finland, is therefore made by research bodies that do not have the *legal* status of a body responsible for conducting safety (or accident) investigations.

## 0. Introduction

As pointed out in the SafetyNet Proposal (Proposal to the European Commission for the 6th Framework Research Programme – Originally prepared 8th April 2003 – Updated 5th December 2003 – Revised 6 December 2004: 30) the notion of independence, as commonly used, is somewhat fuzzy.

The New Britannica/Webster Dictionary & Reference Guide (1988: 455) defines independence as “*the quality or state of being independent: freedom from outside control*”. Independent means “**1: not subject to control or rule by another: SELF-GOVERNING, FREE (an independent nation) 2: not having connections with another: SEPARATE (independent conclusions) 3: not supported by or relying on another: having or providing enough money to live on (a person of independent means) 4: not easily influenced: showing self-reliance (an independent person) 5: having full meaning in itself and capable of standing alone as a simple sentence: MAIN (an independent clause) 6: not committed to a political party 7: having probabilities such that the occurrence or nonoccurrence of one event does not influence the outcome of another (the outcomes of the tossing of two dice are independent)...” These formal definitions give an idea on the general characteristics of something independent. There are some public bodies, central banks for example, that are independent and we should be able to specify the meaning of the notion.**

Historically, one of the first independent government bodies is the Federal Reserve System in the United States of America. The Federal Reserve system was created by the Federal Reserve Act in 1913. “*It is considered an independent central bank because its decisions do not have to be ratified by the President or anyone else in the executive or legislative branch of government, it does not receive funding appropriated by Congress, and the terms of the members of the Board of Governors span multiple presidential and congressional terms. However, the Federal Reserve is subject to oversight by Congress, which periodically reviews its activities and can alter its responsibilities by statute. Also, the Federal Reserve must work within the framework of the overall objectives of economic and financial policy established by the government. Therefore, the Federal Reserve can be more accurately described as “independent within the government.”* (Federal Reserve System, 2004)

Much like the Federal Reserve System, the European Central Bank is independent. “*Neither the ECB, the national central banks of the Eurosystem, nor any member of their decision-making bodies can ask for or accept instructions from any other body. The EU institutions and member state governments must respect this principle and must not seek to influence the ECB or the national central banks.*” (European Communities, 2005) The Court of Justice of European Communities is also an independent and autonomous institution. The Court of Justice home page gives the following information: “*The Judges and Advocates-General [of the Court of Justice] are appointed by common accord of the governments of the Member States and hold office for a*



*renewable term of six years. They are chosen from legal experts whose independence is beyond doubt and who possess the qualifications required for appointment to the highest judicial offices in their respective countries or who are of recognised competence.*" (Court of Justice of the European Communities, no date)

These institutions have characteristics consistent with the formal definition of the notion of independence. They are independent, in the limits of their missions, because they are not subject to outside control. They are separate and do not take instructions from other public bodies. They are financially autonomous and the members of these institutions themselves are qualified and independent. However, this sort of independence applies to institutions or entities only. These entities carry out their mission free from outside influence and the result of their activity is therefore independent; yet for the moment we do not have the necessary tools for evaluating the independence of such results by itself. It is, indeed, one thing to identify an independent entity or to point out why an entity is not as independent as it could, and it is another one to identify an independent output<sup>1</sup>.

In relation to the field of research, the meaning of independence does not seem excessively problematic. As for the central banks or the judicial institution, a certain amount of independence –independence of the entity, that of the researchers and of the research itself– would be vital for the impartiality and the quality of the research process and its results. Several recent controversies have raised the question of independence in scientific research. Even though the notion of independence receives no definition, there is a tacit agreement on the major characteristics of independent research.

An editorial (Lean and Hankey, 2004) in the British Medical Journal started a debate on the health effects of aspartame. One of the responses to the editorial noted the "*glaring disparity between the findings of industry-funded and non-industry funded research.*" (Briffa, 2004) Thus, 100% of the industry funded research found aspartame safe, while 92% of the non-industry funded research found aspartame potentially harmful. This, of course, raises the question of financial conflicts of interest in the industry-funded research. On the other hand, "*[i]t is a dangerous game to assume that non-industry researchers or commentators do not have conflicts...*" (Finer, 2004) If nothing else, the debate highlights the adverse effects of lack of financial independence on the trustworthiness of scientific research.

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<sup>1</sup> Once again, the kind of independence we have just identified does not apply to investigation processes, research programs or their results. We shall consider the independence of the investigation process and its results in detail in sub-tasks 4.2 (database independence), 4.3 (input) and 4.4 (output). For the time being, we shall concentrate our efforts on the independence of investigating bodies. Our first task is to build up a coherent set of items for evaluating the independence of accident investigating bodies. We shall then look at accident investigating bodies in several European countries across all modes of transport as well as their methods and practices of investigation. We shall also identify a set of European and national road safety databases, which we will take under scrutiny in sub-task 4.2.

Another debate concerning the use of scientific research results by U.S. federal agencies in their regulatory missions (Hornstein, 2003) might seem remote from European perspective, but the questions it sets are essential. Hornstein notes that financial conflicts of interest interfere with the conduct of scientific research, casting doubts over its quality. Federal agency regulations, based on independent research results, are taken into court because of their financial consequences. On the same grounds, industry pushes for public access to all data<sup>2</sup> used for policymaking and administration's regulatory activity. The financial aspects are once again central, but a few other issues also emerge, such as the purpose of the research activity and the question of access to data.

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<sup>2</sup> This document adopts the distinction used in the SafetyNet D6.1 Proposal of EuroRIS, page 6. According to D6.1 "data" is "basic", meaning that "data" is something that has not been transformed; in statistics "basic data" would be numbers. "Knowledge" is the result of the analysis based on "basic data". This distinction is similar to the distinction between "facts" and "analysis" in ICAO aviation accident investigation: a preliminary report consists of facts and the final report gives the analysis based on those facts. Both "basic data" and "knowledge" are "information". However, basic data, numbers in statistics, is not available as such. Therefore, we should add another category to this classification. This category would be raw or preferably, source data.

## 0.1. Independence in transport safety research

We have now identified several issues that relate quite closely to the independence of any entity involved in research activities. Narrowing our perspective to transport safety research and accident investigation, we need now to verify if all these issues remain as important, if they deal adequately with the problem of independence in transport safety research and whether they cover all of its aspects.

Pieter Van Vollenhoven, the Chairman of the Dutch Transport Safety Board, reminded us in 2001 that accident investigations in civil aviation *“had to be carried out independently of all interests but one. And that interest [is] safety.”* (Van Vollenhoven, 2001) Nothing should even suggest that interests other than safety could influence a safety investigation, its findings or the subsequent recommendations. Annex 13 to *Convention on International Civil Aviation*, known as *Chicago Convention*, paragraph 5.4 specifies that *“[t]he accident investigation authority shall have independence in the conduct of the investigation and have unrestricted authority over its conduct, consistent with this Annex”*. Paragraph 5.4.1 recommends that *“[a]ny judicial or administrative proceedings to apportion blame or liability should be separate from any investigation conducted under the provisions of this Annex.”* (International Civil Aviation Organization, 1951)

European Transport Safety Council publication *Transport Accident and Incident Investigation in the European Union* (2001) contains recommendations concerning all modes of transport. *“To be genuinely effective, the investigating organisation must be independent. It must have the authority to investigate whatever accident it sees fit, be independent of the regulator and be able to produce its findings, conclusions and recommendations without recourse to higher authority and without interference by any vested interest including the state. It should also be financially independent and not reliant on the regulator for the provision of both fiscal and resource allocations. Secondly, accident investigation bodies must have public confidence. There must, within certain constraints of confidentiality, be total transparency in their work. All reports, recommendations and the actions taken (or not taken) following the publication of a report should also be made public. /.../ any investigation must be conducted with the minimum of delay and after anyone whose reputation might be damaged by its content has had the opportunity to study and comment on it. If re-occurrences are to be avoided, the reports should be published as soon as possible, but generally within 12 months of the accident. To achieve such a demanding target, each state must ensure that its accident investigation body has sufficient resources to enable it to investigate accidents in the necessary depth. When analysing accidents, investigators should have access to databases where, for example, earlier investigations of similar occurrences and recommendations can prove helpful in drawing conclusions.”* The issue of timeliness, raised by ETSC, is something new, as is the access to existing data.

We have a set of issues concerning the independence of any entity involved in transport safety research activities<sup>3</sup>. An independent accident investigation body is not subject to outside control in the pursuit of its mission. It is separate from other bodies, public or private, having financial or other interests in the results of its investigations. It does not take instructions from such bodies or outside personalities. It has adequate control over the use of its investigation results. It is financially autonomous and its members are qualified and independent themselves. Keeping in mind these issues, we will now consider in some detail two examples of rather well known U.S. investigating bodies: the National Transport Safety Board and the National Highway Traffic Safety Administration.

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<sup>3</sup> At this point, we shall make a distinction between “safety research” and “accident investigation”. Safety research includes all research for enhancement of safety, whether it is primary, secondary or tertiary safety. Accident investigation is therefore a part of safety research. In spite of this distinction, we will use these two terms more or less indifferently.

## 0.2. Accident investigation in the United States of America

According to a study (Sarsfield, Stanley, Lebow, Ettetdgui & Henning, 2000) by RAND's Institute for Civil Justice ([www.rand.org](http://www.rand.org)), commissioned by the National Transportation Safety Board Chairperson James Hall, in 1998, the NTSB is *“the most important independent safety investigative authority in the world.”* NTSB investigates all civil aviation accidents and incidents in the United States as well as all major accidents in all other modes of transport. The NTSB itself was established in 1967, but the Civil Aeronautics Act of 1938 established the Air Safety Board, its first predecessor, to investigate civil aviation accidents.

The National Highway Traffic Safety Administration was established in 1970. NHTSA is responsible for reducing human and economic losses resulting from road accidents. NHTSA sets and enforces safety performance standards and helps state and local governments to conduct road safety programs. It investigates safety defects, sets and enforces fuel economy standards, assists states and local communities in reducing the threat of drunk drivers. It promotes the use of safety belts, child safety seats and air bags, investigates odometer fraud, establishes and enforces vehicle anti-theft regulations and provides consumer information on motor vehicle safety topics. It conducts research on driver behaviour and traffic safety in order to develop the most efficient and effective means of bringing about safety improvements.

### 0.2.1 National Transport Safety Board

The National Transportation Safety Board (<http://www.nts.gov/>) is a permanent, independent Federal agency. It was established in 1967 and gained its current status in 1975, when all organisational ties to the Department of Transportation were severed. The NTSB's annual budget was 56 M\$ in 1999.

The U.S. Congress established the National Transportation Safety Board as an independent Government agency by the Independent National Transportation Safety Board Act of 1974. The Congress stated on that occasion that the *“proper conduct of the responsibilities assigned to the Board requires vigorous investigation of accidents involving transportation modes regulated by other agencies of Government; and calls for the making of conclusions and recommendations that may be critical or adverse to any such agency or its officials. No Federal agency can properly perform such functions unless it is totally separate and independent from any other department, bureau, commission, or agency of the United States.”* (Aviation Safety Council, 2002) The Congress clearly identified the necessity of structural independence for accident investigation.

The President of the United States appoints, with the advice and consent of the Senate, the 5 members of the Board, for a term of 5 years. The President appoints, with the advice and consent of the Senate, a Chairperson and Vice Chairperson for the Board, for a term of 2 years. Not more than 3 of the members of the Board may be from the same political party. At least 3 of the members are appointed on account of their competence in the fields of aviation



industries or accident investigation. The President may remove a Board member “*for inefficiency, neglect of duty, or malfeasance in office.*” (USA, 2003b: §1111) The Chairperson appoints the personnel of the Board. The Board has a staff of 425 employees in Washington, D.C. and six regional offices across the United States.

United States Congress has charged the Board with investigating every civil aviation accident in the United States and significant accidents in the other modes of transport –maritime, rail, road and pipeline– and issuing safety recommendations aimed at preventing future accidents. The Board is separate of all regulating bodies and does not initiate enforcement action. “*The Board may use, when appropriate, available services, equipment, personnel, and facilities of a department, agency, or instrumentality of the United States Government...*” (USA, 2003b: §1113)

The Board investigates all civil aviation accidents and certain public-use aircraft accidents in the United States, “*fulfilling the obligations of the United States under Annex 13 to the Chicago Convention on International Civil Aviation*” (USA, 2003a: §831.2). It investigates all major marine accidents and any marine accident involving a public and a non-public vessel in conjunction with the Coast Guard. It investigates rail traffic accidents involving passenger trains or resulting in at least one fatality or major property damage. The Board selects, in cooperation with a State, a highway accident it shall investigate. It shall investigate a pipeline accident with a fatality, substantial property or environmental damage. The Board shall investigate any other transport accident, which is catastrophic or of recurring nature.

The National Transportation Safety Board investigations focus only on improving transport safety. A NTSB investigation aims at determining the facts, conditions, circumstances and the cause or probable causes of the investigated event. The Board's analysis shall not be used as evidence in a judicial inquiry.

The Board may establish a special board of inquiry in case of a civil aviation accident. This special board shall have a NTSB member as chairperson and 2 other members, representing the public and appointed by the President on that occasion. These 2 members shall be competent in safety investigation and shall not have a financial interest in the results of the investigation. The special board has the same authority as the NTSB.

Out of the 440 employees of the Board, 270 are investigators. About half of the personnel and budget of the Board is committed to the civil aviation accident investigation. The Board designates regularly other organisations as parties to its investigations; the Federal Aviation Administration is designated as a party by law. This party system allows the Board to investigate about 2000 aviation accidents and incidents and about 500 accidents in other modes of transport a year.

The NTSB Go Team starts the investigation on the accident site as quickly as possible. A NTSB investigation, with the exception of an investigation on a major marine casualty, has priority over any other official United States



Government investigation, including criminal investigations. The Board organises the appropriate participation of other public entities to the investigation. The NTSB investigators have an immediate access to the site of an accident or an incident. They can take any necessary actions to preserve and safeguard evidence. The safety investigators can remove material, test it and take samples as necessary for the investigation. The safety investigators have access to any material or document relevant to the investigation, they may order an autopsy or obtain a copy of an autopsy report performed by other public body.

The investigation report, over which the Board deliberates in public Board meeting, exposes the conclusions of the Boards investigation. The parties to the investigation do not participate in the establishment of the probable cause of the accident. The Board issues safety recommendations based on the findings of the investigation. These recommendations might not be directly linked to the probable cause of the accident or incident, nevertheless their aim is to prevent similar accidents or incidents from happening in the future. As the Board's mission is to enhance transport safety, it often issues recommendations during the investigation process, before the final investigation report is released. In case of investigation on a major transport accident, the Board may hold a public hearing in order to hear witnesses and to inform the public on the investigation progress. Investigation reports are placed on the Board's web site.

A NTSB safety recommendation addressed to the Secretary of Transportation has to receive a formal written response from the Secretary within 90 days. The response must indicate whether the Department of Transportation intends to adopt the recommendation, completely or in part, or reject it. The response must either provide a timetable for adopting the recommendation or explain the reasons for the Department's refusal. The Secretary of Transportation must report to Congress and to the Board annually on the Department's actions regarding each proposed NTSB recommendation.

The Board publishes annually general reports on aviation safety in public transport and general aviation. It collects aviation accident data and has a database that contains information on 600 data elements since 1982. The Board issues Safety Studies on policies or practices related to transport safety and conducts Special Investigations on issues identified in one or more accident investigations.

According to the RAND's news release on the December 9th 1999, NTSB staff and facilities are "*stretched to the limit*" and the Board must "*acquire additional resources, modernize its investigative procedures, and reform some of its key management practices on an urgent basis if it is to ensure its future independence and integrity. The agency also needs to augment the "party process,"—the traditional practice of allowing interested stakeholders such as airlines, aircraft manufacturers and the Federal Aviation Administration to join in crash probes— by tapping academia, federal agencies such as NASA and the Defense Department, and other sources of independent, analytical expertise.*" (Rand, 1999) In other words, the independence of the NTSB is endangered by



a possible lack of resources in near future, and by the difficulties intrinsic to the party process as it exists.

## 0.2.2 National Highway Traffic Safety Administration

The National Highway Traffic Safety Administration (<http://www.nhtsa.dot.gov/>) was established by the Highway Safety Act of 1970, as the successor to the National Highway Safety Bureau, to carry out safety programs. The NHTSA is an agency within the Department of Transportation. The NHTSA's annual budget was 403M\$ in 2001.

The NHTSA's mission is to reduce fatalities, injuries and economic losses resulting from motor vehicle crashes. The NHTSA does this through setting and enforcing federal safety performance standards for motor vehicles and equipment. NHTSA also gives grants to State and local governments for road safety programs. *"The agency develops, promotes, and implements effective educational, engineering, and enforcement programs directed toward ending preventable tragedies and reducing safety-related economic costs associated with vehicle use and highway travel"* (National Highway Traffic Safety Administration, 2003a). It *"investigates safety defects in motor vehicles, sets and enforces fuel economy standards, helps states and local communities reduce the threat of drunk drivers, promotes the use of safety belts, child safety seats and air bags, investigates odometer fraud, establishes and enforces vehicle anti-theft regulations and provides consumer information on motor vehicle safety topics."* (National Highway Traffic Safety Administration, no date (d)) The NHTSA also conducts research on driver behaviour and traffic safety in order to enhance traffic safety.

The President of the United States appoints and the U.S. Senate approves the appointment of the NHTSA's Administrator. The NHTSA has a staff of over 600 employees in Washington, D.C. and 10 regional offices across the United States.

The National Center for Statistics and Analysis (NCSA), established in 1976, conducts road safety investigations. The NCSA produces data and analyses on the nature, causes and injury outcomes of road accidents and develops strategies for reducing the number of accidents and diminishing their consequences. The NCSA thus provides analytical and statistical support to NHTSA and the road safety community. Its fields of competence include *"human, vehicle, environmental, and roadway characteristics, as they relate to crash frequency and injuries; identifying injury mechanisms and associated crash dynamics in motor vehicle crashes, evaluating the effectiveness of crashworthiness, crash avoidance, and traffic safety efforts; monitoring the magnitude of the traffic safety problem, [and] quantifying the benefits resulting from proposed agency rules"* (National Highway Traffic Safety Administration, no date (b)).

Inside the NCSA, the Office of Data Acquisitions oversees the Crash Investigations Division (CID) responsible for accident investigations and the State Data Reporting Systems Division (SDRSD). The SDRSD provides the information for Fatality Analysis Reporting System (FARS), which contains data



on all U.S. road accidents involving a fatality, and for State Data Program (SDP) gathering information that *"complements national data collection programs such as FARS and NASS GES"* (National Highway Traffic Safety Administration, 2003b), on accidents in 22 States.

The Crash Investigation Division has two components: the National Automotive Sampling System (NASS) and Special Crash Investigations (SCI). NASS is composed of two systems that collect *"data on a representative, random sample of hundreds of thousands of minor, serious and fatal crashes"* (National Highway Traffic Safety Administration, no date (a)) from police accident reports. The Crashworthiness Data System (CDS) focuses on injury causation in passenger vehicle accidents in order to improve vehicle design. The General Estimates System (GES) data is less detailed, while the sample is larger than that of CDS. The GES data is destined to give a more general view on safety problems and trends. The U.S. Congress demands periodically NASS to study a specific element or segment of road safety.

The SCI's mission is to *"examine the safety impact of new, emerging, and rapidly changing technology (such as air bags and alternative fuel systems) and for exploring alleged or potential vehicle defects"* (National Highway Traffic Safety Administration, no date (c)). SCI provides the NHTSA the most detailed accident investigation data available. *"The data collected ranges from basic data maintained in routine police and insurance crash reports to comprehensive data from special reports by professional crash investigation teams. Hundreds of data elements relevant to the vehicle, occupants, injury mechanisms, roadway, and safety systems involved are collected for each of the over 200 crashes designated for study annually."* (National Highway Traffic Safety Administration, no date (c)) The case selection depends on the study orientations, historically accidents involving automatic restraints, i.e. air bags and safety belts have been one of these. The SCI uses a variety of sources for identifying potentially interesting accidents; these sources include NHTSA, other government agencies, manufacturers and medical institutions.

The SCI investigators work on photographs and evidence from the accident site. They investigate the vehicles involved in the accident, interview the victims and witnesses and review the medical data. The investigators gather information on accident and injury causation and consequences as well as on the rescue operations. The information that could allow the identification of the involved persons *"are not included in any public SCI file"* (National Highway Traffic Safety Administration, no date (c)). The SCI program relies on the *"participation and cooperation of automotive manufacturers, suppliers, law enforcement agencies, hospitals, physicians, medical examiners, coroners, tow yard operators, and the individuals involved in crashes"* (National Highway Traffic Safety Administration, no date (c)).

Some recent critics from *"consumer advocates, safety experts and government auditors cite a lack of resources as the prime reason for NHTSA's ineffectiveness. The agency's other problems include inefficient management and inadequate Congressional oversight, ponderous rulemaking procedures and hurdles to enforcement so high that automakers can easily avoid*



*conducting safety recalls.*" (Plungis, 2002) These critics take source on audits made by the Office of Inspector General (2005). The main problem, say the critics, with NHTSA is that of its lack of independence. NHTSA should be an economically disinterested body that promotes road safety, but it has too many ties to manufacturers. It cannot promote safety and regulate the industry at the same time.

### 0.3. Structure of the deliverable

This deliverable deals with the issue of independent accident investigation. It is the first step for work package 4 as a whole. This deliverable seeks to clarify the meaning of "independence" when it comes to transport safety and to road safety in particular. We do not intend to provide an exhaustive bibliographical study or to summarise any original documents used in preparing this deliverable. We aim to grasp the meaning of the notion of independence and assemble a set of items that allow us to evaluate the independence of any entity involved in the investigation of transport accidents.

We have seen so far that the situation in the United States of America is full of contrasts. NTSB has a solid reputation as an independent accident investigation body. NHTSA seems to be in a more difficult situation because it is the safety regulator and the investigating body at the same time. At the light of those examples, the issues that we identified as important for evaluating the independence of an investigating body seem necessary and sufficient. The first chapter will propose an overview of the legal European framework concerning the accident investigation in all modes of transport and based on that overview we will formulate clearly the items for evaluating the independence of an investigating body.

In the Chapters two to six, we shall then consider the entities that investigate accidents in Germany, France, Italy, Finland and United Kingdom, and we will take a brief look at the national road safety data collection practices. Chapter 7 will draw the conclusions on the legal European and national frameworks, the accident investigating bodies and the investigation practices in different transport modes.

Although the SafetyNet Work Package 4 partners include research organisations from the Netherlands and Sweden this deliverable does not assess the Dutch nor the Swedish accident investigation bodies and practices. The reason for this is that Dutch and Swedish partners do not take part in the first tasks of the Work Package. The authors of the present report do not ignore the fact that Sweden for instance, has quite an ambitious policy in the domain of road traffic safety. Moreover, the Swedish situation concerning the road safety investigation shall be considered in detail in a postrequisite deliverable.

The authors would like to thank their colleagues from TNO, VALT and Chalmers for their active participation in the discussions over the issues covered in the present deliverable.

This deliverable contains also, as annex, a preliminary review of road safety databases at European level. This review shall be completed in the deliverable D4.2 Database independence.

# 1. The notion of “independence” as used in the European Union documents

There are, in the field of transport safety, several Directives or Regulations, as well as a White Paper, a Communication from the Commission and a Work Programme, that require our attention.

In the field of aviation safety, there are two Directives that we must consider. Firstly, we shall look at the *Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents*. Secondly, we shall look at the *Directive 2003/42/EC of the European Parliament and of the Council of 13 June 2003 on occurrence reporting in civil aviation*.

For the maritime safety, we will consider three different documents. The *Council Directive 1999/35/EC of 29 April 1999 on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high-speed passenger craft services* is the first. The *Directive 2001/105/EC of the European Parliament and of the Council of 19 December 2001 amending Council Directive 94/57/EC on common rules and standards for ship inspection and survey organisations and for the relevant activities of maritime administrations* will be the second. Finally, the *Regulation (EC) No 1406/2002 of the European Parliament and of the Council of 27 June 2002 establishing a European Maritime Safety Agency* will be the third.

In the field of railway safety, we will first look at the *Council Directive 91/440/EEC on the development of the Community's railways* amended by the *Directive 2001/12/EC of the European Parliament and of the Council of 26 February 2001*. We will then consider the *Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railways*.

For the road safety, we will concentrate on three documents. The first of these documents is the *White Paper – European transport policy for 2010: time to decide* (European Commission, 2001). The second document is a Communication from the Commission: *Saving 20 000 lives on our roads. A shared responsibility. European Road Safety Action Programme* (European Commission, 2003). The third document is the *Thematic Priority 1.6. Sustainable Development, Global Change and Ecosystems. 1.6.2: Sustainable Surface Transport. Work Programme 2002-2006* (European Commission, 2002).

## 1.1. Civil aviation safety

In the *Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents*, the notion of "independence" is used as such only in the Article 6. The accident and incident investigating body is to be "*functionally independent in particular of the national aviation authorities responsible for airworthiness, certification, flight operation, maintenance, licensing, air traffic control or airport operation and, in general, of any other party whose interests could conflict with the task entrusted to the investigating body or entity.*"

The activities of this body are not limited to accident and incident investigation<sup>4</sup> and it may be active on the field of air safety, but in any case, these other activities may not affect its independence. The investigating body must have sufficient resources for carrying out its investigations independently of the national aviation authorities mentioned above. The investigators status must give them the "*necessary guarantees of independence*" and the investigation itself shall have "*a legal status that will enable the investigators-in-charge to carry out their task in the most efficient way and within the shortest time*".

The investigating body has an obligation to investigate every accident or serious incident<sup>5</sup>. The investigating body determines the appropriate method and the

<sup>4</sup> The following definition is that of ICAO (1951). The Council Directive 94/56/EC definition, in article 3(e), is identical.

"An *investigation* means a process conducted for the purpose of accident and incident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations."

<sup>5</sup> The following definitions are those of ICAO (1951). The Council Directive 94/56/EC definitions, in articles 3(a), (j) and (k) are identical.

"An *accident* is an occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which:

a) a person is fatally or seriously injured as a result of

- being in the aircraft, or

- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or

- direct exposure to jet blast,

**except** when the injuries are from natural causes, self inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which:

- adversely affects the structural strength, performance or flight characteristics of the aircraft, and

- would normally require major repair or replacement of the affected component,

**except** for engine failure or damage. when the damage is limited to the engine, its cowlings or accessories: or for damage limited to propellers, wing tips, antennas, tires, brakes, fairings, small dents or puncture holes in the aircraft skin; or

c) the aircraft is missing or is completely inaccessible.



scope of the investigation, which depend on the safety lessons that the body expects to draw from the case. The nature of the investigations concern safety lessons only; liability issues are expressly excluded. The findings of an incident investigation are public and must protect the anonymity of the involved.

*Directive 2003/42/EC of the European Parliament and of the Council of 13 June 2003 on occurrence reporting in civil aviation* considers that in order to improve air safety, new measures have to be taken. The Member States shall provide for the reporting, collection, evaluation, processing and storage of aviation occurrences<sup>6</sup>. The body entrusted with the responsibility to collect and process the reported occurrences may be the investigating body referred to in the Council Directive 94/56/EC. It may also be the national civil aviation authority or any other independent body, “*working with impartiality*”. This body shall “*store the reports collected in their databases*”, furthermore “*accidents and serious incidents shall also be stored in these databases*”.

The Directive also provides for disidentification, which “*means removing from reports submitted all personal details pertaining to the reporter and technical details which might lead to the identity of the reporter, or of third parties, being inferred from the information.*”

Apart from the “independence” of the investigating body and that of the investigators, the Directive 94/56/EC reformulates the requirements that Annex 13 to the Convention on International Civil Aviation, known as the Chicago Convention, has set to ICAO member States concerning the aircraft accident and incident investigation. The Chicago Convention was signed in 1944, the first version of Annex 13 was adopted in 1951 and the current version, the ninth, was adopted in 2001.

The *Regulation (EC) No 1592/2002 of the European Parliament and of the Council of 15 July 2002, on common rules in the field of civil aviation and establishing a European Aviation Safety Agency*

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*Note 1.-- For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.*

*Note 2.-- An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.*

An *incident* is an occurrence, other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operation.

*Note – The type of incidents, which are of main interest to the ICAO for accident preventing studies are listed in the ICAO Accident/Incident Reporting Manual.*

A *serious incident* is an incident involving circumstances indicating that an accident nearly occurred.

*Note 1.– The difference between an accident and a serious incident lies only in the result.*

*Note 2.– Examples of serious incidents can be found in Attachment D of Annex 13 and in the ICAO Accident/Incident Reporting Manual (Dot 9156)."*

<sup>6</sup> The Directive defines an occurrence as follows: an occurrence means an operational interruption, defect, fault or other irregular circumstance that has or may have influenced flight safety and that has not resulted in an accident or serious incident /.../ as defined in Article 3(a) and (k) of Directive 94/56/EC.



(<http://www.easa.eu.int/home/index.html>) entrusts the Agency a role similar to that of Federal Aviation Administration in the USA. The Agency will set common standards to ensure the aviation safety; it will oversee their application across Europe and promote them worldwide. It will progressively assist the legislator in the development of common European rules for *“the certification of aeronautical products, parts and appliances; the approval of organisations and personnel engaged in the maintenance of these products; the approval of air operations; the licensing of air crew; the safety oversight of airports and air traffic services operators.”* (European Commission, 2005)

## 1.2. Maritime safety

The *Council Directive 1999/35/EC on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high-speed passenger craft services* is a lot broader in scope than the Directives concerning the investigation of aviation accidents, incidents and occurrences. However, some of the articles that do not concern accident and incident investigation are interesting from the strict point of view of independence. The article 2 defines a *qualified inspector* as a public-sector employee or other person, duly authorised by the competent authority to conduct surveys and inspections and fulfilling certain criteria of qualification and independence further specified in the Annex V. "*The qualified inspectors carrying out specific surveys shall have no commercial interest either in the company concerned or any other company operating on a regular service to and from the involved host State or in the ro-ro ferries or high-speed passenger craft inspected, nor shall the qualified inspectors be employed by or undertake work on behalf of non-governmental organisations which carry out statutory or classification surveys or issue certificates for that ro-ro ferry or high-speed passenger craft.*"

Article 12 on Accident Investigation sets no obligation for Member States to establish independent bodies to conduct accident investigation. They are to "*define, in the framework of their respective internal legal systems, a legal status that will enable them and any other substantially interested Member State to participate, to co-operate in, or where provided for under the Code for the investigation of marine casualties, to conduct any marine casualty or incident investigation<sup>7</sup> involving a ro-ro ferry or high-speed passenger craft.*" The article specifies that *marine casualty* shall have the same definition as in the Code for the Investigation of Marine Casualties and Incidents, Resolution A849/20 of International Maritime Organisation (IMO, 1997) adopted on November 27<sup>th</sup>, 1997<sup>8</sup>.

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<sup>7</sup> The IMO (1997) Code for the Investigation of Marine Casualties and Incidents gives the following definition.

"A *marine casualty or incident safety investigation* means a process held either in public or in camera conducted for the purpose of casualty prevention which includes the gathering and analysis of information, the drawing of conclusions, including the identification of the circumstances and the determination of causes and contributing factors and, when appropriate, the making of safety recommendations."

<sup>8</sup> The IMO (1997) Code for the Investigation of Marine Casualties and Incidents gives the following definitions.

"A *marine casualty* means an event that has resulted in any of the following:

- 1/ the death of, or serious injury (*serious injury* means an injury which is sustained by a person in a casualty resulting in incapacitation for more than 72 hours commencing within seven days from the date of injury) to, a person that is caused by, or in connection with, the operations of a ship; or
- 2/ the loss of a person from a ship that is caused by, or in connection with, the operations of a ship; or
- 3/ the loss, presumed loss or abandonment of a ship; or
- 4/ material damage to a ship; or
- 5/ the stranding or disabling of a ship, or the involvement of a ship in a collision; or

The accident investigations shall be conducted “*in the most efficient way and within the shortest possible time taking into account the Code for the investigation of marine casualties*”. The findings of such investigations shall be public. The Directive does not specify the objectives of the investigation, but since the Directive’s aim is, in particular, to ensure the harmonised enforcement of some principles agreed on within the IMO we can assume that the objectives of an investigation are the same for the two. The IMO (1997) Code for the investigation of marine casualties states that “[i]deally, marine casualty investigation should be separate from, and independent of, any other form of investigation”, that “[i]deally, it is not the purpose of such investigations to determine liability, or apportion blame”, and, furthermore, that “[r]eports, or relevant parts of reports, into the circumstances and causes of a marine casualty should be completed as quickly as practicable, and be made available to the public and the shipping industry in order to enhance safety of life at sea and protection of the marine environment through improved awareness of the factors which combine to cause marine casualties.”

The annex to the *Directive 2001/105/EC of the European Parliament and of the Council of 19 December 2001 amending Council Directive 94/57/EC on common rules and standards for ship inspection and survey organisations and for the relevant activities of maritime administrations*, contains the following criteria about the organisations concerned with the inspection, survey and certification of ships: “*The organisation must not be controlled by shipowners or shipbuilders, or by others engaged commercially in the manufacture, equipping, repair or operation of ships. The organisation must not be substantially dependent on a single commercial enterprise for its revenue. The recognised organisation must not carry out statutory work if it is identical with or has business, personal or family links to the shipowner or operator. This incompatibility shall also apply to surveyors employed by the recognised organisation.*”

In addition to this, the *Regulation (EC) No 1406/2002 of the European Parliament and of the Council of 27 June 2002 establishing a European*

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6/ material damage being caused by, or in connection with, the operation of a ship; or

7/ damage to the environment brought about by the damage of a ship or ships being caused by, or in connection with, the operations of a ship or ships.

A *very serious casualty* means a casualty to a ship, which involves the total loss of the ship, loss of life or severe pollution.

A *serious casualty* means a casualty which does not qualify as a very serious casualty and which involves:

1/ a fire, explosion, grounding, contact, heavy weather damage, ice damage, hull cracking or suspected hull defect, etc., resulting in;

2/ structural damage rendering the ship unseaworthy, such as penetration of the hull underwater, immobilization of main engines, extensive accommodation damage etc.; or

3/ pollution (regardless of quantity); and/or

4/ a breakdown necessitating towage or shore assistance.

A *marine incident* means an occurrence or event being caused by, or in connection with, the operations of a ship by which the ship or any person is imperilled, or as a result of which serious damage to the ship or structure or the environment might be caused.”



Maritime Safety Agency (<http://www.emsa.eu.int/>) entrusts the Agency, among other tasks, a role in safety and accident investigation. The Agency "*shall facilitate co-operation between the Member States and the Commission in the development, with due regard to the different legal systems in the Member States, of a common methodology for investigating maritime accidents according to agreed international principles, in the provision of the support of the Member States in activities concerning investigations related to serious maritime accidents, and in the carrying out of an analysis of existing accident investigation reports*" and "*it shall provide the Commission and the Member States with objective, reliable and comparable information and data on maritime safety and on pollution by ships to enable them to take the necessary steps to improve maritime safety and prevention of pollution by ships and to evaluate the effectiveness of existing measures. Such tasks shall include the collection, recording and evaluation of technical data in the fields of maritime safety and maritime traffic, as well as in the field of marine pollution, both accidental and deliberate, the systematic exploitation of existing databases, including their cross-fertilisation, and, where appropriate, the development of additional databases.*"

### 1.3. Railway safety

The *Council Directive 91/440/EEC on the development of the Community's railways amended by the Directive 2001/12/EC of the European Parliament and of the Council of 26 February 2001* sets to the Member States the obligation to "ensure that safety standards and rules are laid down, rolling stock and railway undertakings are certified accordingly and accidents investigated. These tasks shall be accomplished by bodies or undertakings that do not provide rail transport services themselves and are independent of bodies or undertakings that do so..."

The *Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railways* is also broad in scope. The Chapter IV deals with the creation of a national safety authority in all Member States. The safety authority shall be responsible for regulating and supervising railway safety and it "shall be independent in its organisation, legal structure and decision making from any railway undertaking, infrastructure manager, applicant and procurement entity".

Chapter V of the Directive concerns accident and incident investigation<sup>9</sup>. The investigating body shall investigate all serious accidents<sup>10</sup> and it may "investigate those accidents and incidents which under slightly different conditions might have led to serious accidents". In the latter case, the decision to open an investigation is at the discretion of the investigating body. The investigating body determines the appropriate method and the scope of the investigation as these depend on the safety lessons that the body expects to draw from the case. The investigation shall have a legal status "that will enable the investigators-in-charge to carry out their task in the most efficient way and within the shortest time".

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<sup>9</sup> The Directive gives the following definition in its article 3(n).

"An *investigation* means a process conducted for the purpose of accident and incident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the determination of causes and, when appropriate, the making of safety recommendations."

<sup>10</sup> The Directive gives the following definitions in its articles 3(k), (l) and (m). The International Union of Railways (UIC) has adopted the same definitions in its Safety Data Base (UIC-SDB) project ([http://www.uic.asso.fr/infra/article.php3?id\\_article=55](http://www.uic.asso.fr/infra/article.php3?id_article=55)).

"An *accident* means an unwanted or unintended sudden event or a specific chain of such events which have harmful consequences; accidents are divided into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others.

A *serious accident* means any train collision or derailment of trains, resulting in the death of at least one person or serious injuries to five or more persons or extensive damage to rolling stock, the infrastructure or the environment, and any other similar accident with an obvious impact on railway safety regulation or the management of safety; "extensive damage" means damage that can immediately be assessed by the investigating body to cost at least EUR 2 million in total.

An *incident* means any occurrence, other than accident or serious accident, associated with the operation of trains and affecting the safety of operation."

When the safety investigation and the judicial inquiry are conducted simultaneously and therefore in cooperation – in particular, the safety investigators must have access to all evidence – these investigations remain separate and the independent safety investigation shall only concern the causes of the accident or incident and the safety recommendations that can be drawn from it. These safety recommendations create no presumption of blame or liability for the accident or incident.

The investigating body shall be permanent. It *“shall be independent in its organisation, legal structure and decision making from any infrastructure manager, railway undertaking, charging body, allocation body and notified body, and from any party whose interests could conflict with the tasks entrusted to the investigating body. It shall furthermore be functionally independent from the safety authority and from any regulator of railways.”* The investigating body must have sufficient resources for carrying out its investigations and the investigators status must give *“them the necessary guarantees of independence”*. The investigators shall have access to the accident site and all relevant rolling stock, infrastructures and installations. They can immediately list evidence and remove it. They have access to the medical information of the persons involved. They can hear witnesses and access on-board and other recorders or other records or documents relevant to the investigation. *“Member States shall make provision that railway undertakings, infrastructure managers and, where appropriate, the safety authority, are obliged immediately to report accidents and incidents /.../ to the investigating body.”*

The Directive explicitly authorises the investigating body to combine the responsibility of investigating railway accidents and incidents with the responsibility of investigating other occurrences. *“The investigating body may combine its tasks under this Directive with the work of investigating occurrences other than railway accidents and incidents as long as such investigations do not endanger its independence.”* The investigation is transparent and accomplished under *“as much openness as possible so that all parties can be heard and can share the results”*. The investigating body shall publish the final report in the shortest possible time *“and normally not later than 12 months after the date of occurrence.”*

The report shall remind the objectives of the investigation, which are *“possible improvement of railway safety and the prevention of accidents”*. Annex V of the Directive sets the report format that all reports should follow as closely as possible. Annex V also reminds that the testimonies are subject to the protection of identity of the persons.

The *Regulation (EC) No 881/2004 of the European Parliament and of the Council of 29 April 2004 establishing a European railway agency ([http://europa.eu.int/comm/transport/rail/era/index\\_en.htm](http://europa.eu.int/comm/transport/rail/era/index_en.htm))*, entrusts the Agency a major role in interoperability and safety matters on European level. The Agency will provide the technical assistance necessary to implement the Directive 2004/49/EC. It will network *“with the national authorities responsible for safety and the authorities responsible for investigations, in particular to encourage the exchange of experience and the development of a common*



*safety culture.*” (European Railway Agency, 2004) It will prepare and propose Common Safety Methods and Common Safety Targets, as well as other measures in the field of railway safety. It will monitor the safety performance, on the basis of the Common Safety Indicators, National safety information as well as its own safety information. The Agency will keep a database on railway safety and publish a biannual report. *“The Agency /.../ shall cooperate with Eurostat to avoid any duplication of work and to ensure methodological consistency between the common safety indicators and the indicators used in other modes of transport.”* (European Railway Agency, 2004: 10)

## 1.4. Road safety

The 12 September 2001 the Commission approved the White Paper on European transport policy (European Commission, 2001). It announced a Communication from the European Commission proposing a European Road Safety Action Programme (European Commission, 2003), which sets the target of halving the number of people killed each year on European roads by 2010. One of the areas of action included in this Programme is accident investigation. The independent road accident investigations should be developed in taking example of the accident investigations in civil aviation. The Communication considers the *Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents* as a model for other modes of transport.

Since the road accident investigations aim at determining the causes of an accident they should be independent from all other investigations concerned with liability issues, such as a judicial inquiry or an investigation conducted by insurance companies. The accidents should be investigated at national level but accordingly to a common European methodology. Public European databases would then integrate the results of such investigations. The European databases would be open in particular to the researchers in order to find the most effective ways to fight road transport unsafety. *"European legislation on this type of investigations has been in force for several years concerning civil aviation. A similar obligation has been proposed for the railways. The Commission is now considering proposing that similar investigations should be carried out concerning maritime transport and in the longer term concerning road accidents."* (European Commission, 2003)

In the *Work Programme 2002-2006* (European Commission, 2002) independent accident investigation and the data produced and maintained as a result of that activity are seen to closely depend upon viable financial and institutional arrangements providing a sound basis for such independent road safety investigation. This kind of investigation has, as objective, to determine the causes of an accident, rather than to assign liabilities. Only interdisciplinary research teams, able to combine different forms of knowledge – road engineering, mechanical, medical, psychological, meteorological etc. can attain such an objective. The produced data must respect anonymity. It is to be public i.e. it will not be commercialised. All this must be done in a way that respects the existing legal framework.

## 1.5. Structural, financial and functional independence

The notion of independence, as we identified it in the introduction and as it is used in the European Union papers and concerns transport accident investigation, refers clearly to the structural, financial and functional independence of the investigating body. This structural, financial and functional independence should guarantee the impartiality, the completeness and the quality of the enquiries that the investigating body conducts. By extension, independent accident investigation concerns safety issues only; the investigation excludes judicial aspects.

This deliverable deals with the issue of independence of investigation bodies and leaves the issue of necessary qualifications and experience of investigators to a prerequisite deliverable. It is however worth noting at this point that there is no clear definition of a “qualified” and “experienced” investigator.

For civil aviation, the *Council Directive 94/56/EC* defines the investigator-in-charge as follows. “[I]nvestigator-in-charge’ means a person charged, on the basis of his qualifications, with responsibility for the organization, conduct and control of an investigation.”

In the maritime, the Annex V on *Criteria of qualification and independence for qualified inspectors* to the *Council Directive 1999/35/EC* defines quite clearly a qualified inspector. However, the article 12 of the Directive, concerning directly *Accident investigation* does not deal with the issue of qualification and experience of the investigators at all. The IMO Code for the investigation of marine casualties defines a marine casualty investigator as follows. “*Marine casualty investigator means a person or persons qualified and appointed to investigate a casualty, or incident, under procedures laid down in national legislation for the furtherance of marine safety and protection of the marine environment.*”

In the domain of rail transport the *Directive 2004/49/EC of the European Parliament and of the Council* defines investigator-in-charge as follows. “[I]nvestigator-in-charge’ means a person responsible for the organisation, conduct and control of an investigation.” The investigation body “shall comprise at least one investigator able to perform the function of investigator-in-charge in the event of an accident or incident.” “For each accident or incident the body responsible for the investigation shall arrange for the appropriate means, comprising the necessary operational and technical expertise to carry out the investigation. The expertise may be obtained from inside or outside the body, depending on the character of the accident or incident to be investigated.”

The necessary qualifications and experience of the investigators of transport accidents is an issue left largely to national authorities. It seems that this aspect of independence of safety or accident research does not intervene exactly on the same level as the structural, financial and functional characteristics of the entities charged with a mission to investigate accidents and incidents.



The following checklist sums up the characteristics of structural, financial and functional independence. The first items constitute an “identity sheet” of the investigating body. The next items receive “yes” or “no” as an answer. In some cases, however, the item does not apply to the investigating body –*nap* for not applicable– or the information concerning the item has not been available –*nav* for not available.

Established	year
Legal form of the body	<i>public authority, registered association, enterprise... –If public: federal body, state body or other; charged or not with the mission to conduct safety investigations, in other words dedicated or not; what ministry (if applicable)... –If enterprise: corporation, private company...</i>
Current status	<i>year the status was gained; current international and national legal framework</i>
Relation to the public powers	<i>procedure for nominating the head and high rank procedure for dismissing them length of their terms</i>
Budget	<i>in €</i>
Personnel	<i>total; out of which investigators</i>
Events notified (year)	<i>per year (most recent available year, or average and if applicable)</i>
Events investigated (year)	<i>per year (most recent available year, or average and if applicable)</i>
Reports published (year)	<i>per year (most recent available year, or average and if applicable)</i>

*Structural independence:*

Separate from the competition authority	yes/no
<i>The competition authority means the authority responsible for maintaining the conditions for fair and undistorted competition in the market.</i>	
Separate from the operations authority	yes/no
<i>The operations authority means the authority responsible for technical regulation.</i>	
Separate from the safety authority	yes/no
<i>The safety authority means the authority responsible for safety regulation.</i>	
Permanence of the investigating body	yes/no
Safety investigation’s legal status	yes/no
<i>A safety investigation means a process conducted for the purpose of accident and incident prevention which includes the gathering and analysis of information, the drawing of conclusions, including the identification of the circumstances and the determination of causes or probable causes and contributing factors and, when appropriate, the making of safety recommendations.</i>	
Safety investigator’s legal status	yes/no
<i>A safety investigator means an employee of the permanent body or appointed by it, and charged, on the basis of his or her qualifications, with the organisation, conduct or control of a safety investigation.</i>	
Liability issues excluded	yes/no
<i>The purpose of the investigation is not to determine liabilities or to apportion blame.</i>	
Findings cannot be used for the purposes of the judicial enquiry	yes/no
<i>The law excludes the use of the safety investigations findings for the purposes of a judicial enquiry concerning the investigated event.</i>	



*Financial independence:*

- Financial autonomy of the investigating body yes/no  
*The investigating body has an autonomous budget, allowing it to function.*
- Financial autonomy to carry out investigations yes/no  
*The investigating body can conduct any safety investigation it sees fit without external financing.*
- Absence of relations to the industry (constructors, operators or others) yes/no  
*The investigating body has relations to the industry if it is not separated from the regulating authorities, or if it is financially dependant on the industry, either because it is part of a commercial organisation having interest in the industry, or because it cannot conduct its investigations without financing from the industry.*

*Functional independence:*

- Obligation to investigate yes/no  
*The legislator has laid down a list of types of accidents and incidents the investigating body shall investigate.*
- Liberty to investigate yes/no  
*The investigating body can decide, on its own, to investigate an accident or incident that the investigating body does not have the obligation to investigate.*
- Autonomous determination of the scope of the investigation yes/no  
*The safety investigator in charge of the investigation determines the scope of the investigation.*
- Autonomous determination of the methods of investigation yes/no  
*The safety investigator in charge of the investigation determines the method(s) of the investigation.*
- Access to the evidence yes/no  
*The safety investigators have access to the evidence of a judicial enquiry.*
- Access to the witnesses yes/no  
*The safety investigators have access to the witnesses of a judicial enquiry.*
- Investigation accessible to observers of the State of design yes/no  
*The State of design means a State having jurisdiction over the organisation responsible for the type design. Vehicle means something used to transport persons or goods.*
- Investigation accessible to observers of the State of manufacture yes/no  
*The State of manufacture means a State having jurisdiction over the organisation responsible for the final assembly of the vehicle.*
- Investigation accessible to observers of the State of occurrence yes/no  
*The State of occurrence means a State in territory of which an accident or incident occurs.*
- Investigation accessible to observers of the State of operator yes/no  
*The State of operator means the State in which the operator's principal place of business is located or, if there is no such place of business, the operators permanent residence.*
- Investigation accessible to observers of the State of registry yes/no  
*The State of registry means a State on whose register the vehicle is entered.*
- Investigation accessible to observers of other substantially interested State yes/no  
*A State where an accident or incident caused, or threatened to cause, serious harm to the environment or constructions; or, where, as a result of the accident nationals of that State lost their lives or received serious injuries; or that has at its disposal important information that may be of use to the investigation; or that for some other reason establishes an interest that is considered significant by the State in charge of the investigation.*



Investigation accessible to observers of other interested organisations	yes/no
<i>An interested organisation means an organisation that establishes an interest that is considered significant by the State in charge of the investigation.</i>	
Diverging comments of the observers published	yes/no
<i>The final report of a case study contains the diverging comments of the observers relevant to the investigation.</i>	
Findings are public	yes/no
<i>Findings mean reports in case of case studies, or any public documents, such as studies, based on statistical analysis.</i>	
Reports published without further scrutiny	yes/no
<i>The intermediary or/and final reports are published by the investigating body and are not submitted to any external scrutiny before their publication.</i>	
Respect of the anonymity	yes/no
<i>The anonymity of the involved persons is protected, except when this would not allow to understand the findings, the drawing of conclusions and the making of safety recommendations.</i>	

An investigation can be assisted by foreign observers from similar investigating bodies of the states of design, manufacture, operator, registry, or of any (other) substantially interested state. However, if the legal framework does not expressly state this, the answer to the ad hoc questions is “no”. If the legal framework states, with no further specification, that foreign observers can assist the investigation; that it is open to any substantially interested state, this includes those of manufacture, design and operator.

In order for an accident investigating body to be “independent”, the answer to all the binary questions should be “yes”<sup>11</sup>. If that is not the case, the ideal conditions for carrying out an independent investigation do not fully exist. “Yes” to all the binary questions, means that the ideal conditions for carrying out an independent investigation exist.

In the first case, the fact that the investigating body is not entirely independent does not mean that the results of an investigation it has carried out are not reliable. It means that any doubts concerning their reliability cannot be dissipated because of lack of independence.

In the second case, the fact that the investigating body is independent does not mean that the results of an investigation it has carried out are reliable. It means that their reliability is not in doubt because of lack of independence of the investigating body.

The independence or the lack of independence of an investigating body, as assessed by the checklist, is not an adequate instrument for evaluating the results of an actual investigation carried out by that body. The lack of independence of an investigating body can merely point out why an investigation carried out by it might contain biases. Further inquiries on the

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<sup>11</sup> “Yes” is synonymous to “true” and “no” is synonymous to “false”. The appropriate answer to items such as “Findings cannot be used for the purposes of the judicial enquiry” is therefore “yes” if the assertion is “true” and “no” if the assertion is “false”.

relevant items of the checklist would be necessary in order to find out in what way and what sort of biases this assessed lack of independence might induce.

The authors have tried to verify all the information contained in the following descriptions, by searching as much publicly available information as possible. However, some items might have received an erroneous answer. This would most probably result from the intrinsic ambiguity of the available documents concerning the investigation bodies. Sometimes even a discussion with the representatives of those bodies has not allowed clarifying all such ambiguities<sup>12</sup>.

The presence of possible errors in the evaluations does not undermine their overall quality. The (lack of) independence –not to mention the quality of its work– of an investigating body is not dependent on a response to a single item for evaluating its independence.

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<sup>12</sup> The authors have, in some cases, met the representatives of the assessed investigating bodies. However, interviews were not the primary source of information at this stage of the project. The authors filled out the checklists on the ground of publicly available information on the investigating bodies and other relevant documents. The present document is therefore a “bibliographical analysis” in a very literal sense.

## 2. Accident investigation in Germany

There is no central register for the collection of statistical data concerning all transport accidents in Germany except for road traffic accidents by the Federal Statistical Office (Statistisches Bundesamt STBA).

According to the statutes of the investigating bodies of the different transport modes (aviation, maritime, railway and road traffic), all severe accidents in these transport modes are recorded by the corresponding investigating bodies: BFU (German Federal Bureau of Aircraft Accidents Investigation), BSU (Federal Bureau of Maritime Causality Investigation), EBA (Federal Office of Railway), GIDAS (German In-Depth Accident Study). Thus the statistical documentation of the accidents in databases is done in different databases, according to the transport mode and to the investigating body.

There is a dedicated accident investigating body for civil aviation (BFU) and for maritime investigations (BSU). The EBA is the Federal authority for rail and it has both regulatory and investigative missions. The BAST (Federal Road Research Institute) and the German Research Association of Automotive Industry (FAT) investigate road accidents by in-depth research teams on scene (GIDAS). The use of this data is possible for public and third parties

At present the most comprehensive statistical documentation exists for road traffic accidents, for which the most automated method of data collection out of all transport modes. Statistical documentation has been continuously conducted since 1954. The accident statistics are public and the contents can be freely used. In contrast, the information concerning the other types of traffic usually refers to single incidents. Statistical databases for these types of accidents only exist for the last few years.

Traffic accidents are largely investigated by the police for the forensic collection of evidence as well as the statistic documentation. The Statistische Bundesamt publishes the data annually. For the last few years there is also the possibility of accessing it via the internet. (<http://www.destatis.de>).

In addition to this, the German Insurance Companies (GDV Gesamtverband der Deutschen Autoversicherer) collect traffic accident information. A number of insurance companies provide information on accidents that they have dealt with to the GDV. As they have access to the attorney's office's records, they have data based on police documentation, possibly involving experts and medical information. External users cannot access this data.

In Germany experts work in the forensic field by order of the public prosecutor's office. DEKRA uses the expert's statement results to construct a database of accident data. Once again, external users cannot use this data.

## 2.1. BFU – Federal Bureau of Aircraft Accidents Investigation

According to the law on the investigation of air traffic accidents (Flugunfall-Untersuchungs-Gesetz – FIUUG; Germany, 1998) the Bundesstelle für Flugunfälle - BFU (German Federal Bureau of Aircraft Accidents Investigation; <http://www.bfu-web.de>) in Braunschweig has the task of investigating all incidents and accidents in civil air traffic, which occur within German territory. In case of an accident or incident occurring over foreign territory and involving a German built aircraft, or an aircraft belonging to a German operator, and no other organisation is investigating the event, the BFU shall investigate it in compliance with the foreign justice.

The sole intent of the investigation's results is to find the causes with the aim of preventing the reoccurrence of future accidents and incidents. The determination of guilt or liability is not part of the investigation's remit.

The BFU was founded by the Federal Ministry of Traffic and it works functionally and organisationally independent from market, operations and safety authorities. Instructions concerning the scope and contents of the investigation must not be given to the BFU.

The director of the BFU is the supervisor of the heads of the investigation, the investigators and other staff. He may also recruit specialists from the private sector for the accident investigations.

The BFU's investigation consists determining the causes of an accident or incident. The BFU defines the scope of the investigation and is not bound by any regulations other than the FIUUG.

The investigation finishes with the publication of its findings. Ensuring anonymity the report presents the details of the accident/incident, the aircrafts involved, the results of the investigation and the determination of the (possible) causes.

The BFU does publish annual reports but data has only been collected in a database for a small number of years.

The law and the terminology are harmonised with the Annex 13 to the ICAO convention and the European Union Directive on accident and incident investigation (94/56/EC).

Established	1998	
Legal form of the body	Federal authority	
Current status	1998; Annex 13 of the Chicago Convention; Directive 94/56/EC; Flugunfall-Untersuchungs- Gesetz FIUUG, August 26th, 1998	
Relation to the public powers	<i>nav</i>	
Budget	2,4 M€	
Personnel	35	
Events notified (2003)	44	
Events investigated (2003)	44	
Reports published (2003)	44	
<i>Structural independence:</i>		
Separate from the market authority		yes
Separate from the operations authority		yes
Separate from the safety authority		yes
Permanence of the investigating body		yes
Safety investigation's legal status		yes
Safety investigator's legal status		yes
Liability issues excluded		yes
Findings cannot be used for the purposes of the judicial enquiry		yes
<i>Financial independence:</i>		
Financial autonomy of the investigating body		yes
Financial autonomy to carry out investigations		yes
Absence of relations to the industry (constructors, operators or others)		yes
<i>Functional independence:</i>		
Obligation to investigate		yes
Liberty to investigate		yes
Autonomous determination of the scope of the investigation		yes
Autonomous determination of the methods of investigation		yes
Access to the evidence		yes
Access to the witnesses		yes
Investigation accessible to observers of the State of design of the vehicle		yes
Investigation accessible to observers of the State of manufacture		yes
Investigation accessible to observers of the State of occurrence		yes
Investigation accessible to observers of the State of operator		yes
Investigation accessible to observers of the State of registry		yes
Investigation accessible to observers of other substantially interested State		yes
Investigation accessible to observers of other interested organisations		no
Diverging comments of the observers published		yes
Findings are public		yes
Reports published without further scrutiny		yes
Respect of the anonymity		yes

## 2.2. BSU – Federal Bureau of Maritime Causality Investigation

There is no central recording of waterway accidents. For inland waterways, no coordinated documentation exists. Only five of the inland waterways authorities document their accidents.

In the field of maritime accidents, a preliminary investigation may be conducted by the harbour police and its results turned over to the Bundesstelle für Seeunfalluntersuchung (Federal Bureau of Maritime Causality Investigation) – BSU (<http://www.bsu-bund.de>). The BSU investigation starts as soon as it receives an initial notification by telephone.

The BSU was founded in June 2002. A BSU investigation after an accident at sea is conducted according to the maritime safety investigation law (Seesicherheits-Untersuchungs-Gesetz SUG; Germany, 2002). The SUG became effective in June 2002 and the law on the investigation of air traffic accidents (FIUUG) closely inspired it. It implements the international IMO Code A 849 (20). The IMO Code sets the obligation to every flag country to conduct an investigation on accident to any of its ships.

The BSU is part of the operating range of the federal ministry for traffic and is therefore a federal authority. The director of the BSU supervises all the investigating team. He may also recruit specialists from the private sector for the accident investigations.

On the grounds of the IMO code, the BSU must investigate damage or danger-causing maritime incidents or accidents, in order to improve the safety precautions of shipping, safety at work on seagoing vessels and to avoid the pollution of the seas. The investigation should not serve to appoint guilt or liability.

The BSU investigates all seafaring occurrences on German territorial waters. The BSU will investigate occurrences outside German territorial waters if ships sailing under the German flag are involved.

All accident reports are recorded and statistically evaluated.

The BSU sets up statistics according to § 15 (SUG) – similar to the § 28 FIUUG – on accidents and severe occurrences at sea, which have to be published annually in an abbreviated form.

Established	2002
Legal form of the body	Federal Authority
Current status	2002; IMO Code 27/11/1997; Directive 1999/35/EC; Seesicherheits-Untersuchungs-Gesetz SUG, June 20th 2002
Relation to the public powers	<i>nav</i>
Budget	1 M€
Personnel	12
Events notified (2003)	392
Events investigated (2003)	106
Reports published (2003)	106

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	yes
Liberty to investigate	yes
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the State of design of the vehicle	yes
Investigation accessible to observers of the State of manufacture	yes
Investigation accessible to observers of the State of occurrence	yes
Investigation accessible to observers of the State of operator	yes
Investigation accessible to observers of the State of registry	yes
Investigation accessible to observers of other substantially interested State	yes
Investigation accessible to observers of other interested organisations	no
Diverging comments of the observers published	yes
Findings are public	yes
Reports published without further scrutiny	yes
Respect of the anonymity	yes

## 2.3. EBA – Federal Office of Railway

The reform of the German *Bundesbahn* in 1994 and therewith the separation of entrepreneurial and mandatory functions has left the *Bahn AG* as the private company and the Eisenbahn-Bundesamt EBA (Federal Office of Railway) as the mandatory organisation. The EBA is the market and operating authority for the federal railways and for foreign railroad companies operating within the Federal Republic of Germany (<http://www.eisenbahn-bundesamt.de>).

With 1300 employees in 13 offices, the EBA looks after the day-to-day safety of railway passengers by construction supervision, inspection and approval of vehicles and monitoring the safe condition of the railroad operational network. The EBA also validates funds for new construction, upgrading and maintenance of the railroad system. According to the federal law about railway traffic administration the EBA must carry out technical investigations of all dangerous events in the railway environment. A dangerous event is an accident or an event, which could lead to an accident. An investigation focuses on gathering information about the circumstances of the accident and determining its cause.

The commissioner for accident investigation decides upon the investigation of dangerous events. He reports directly to the head of the federal authority and is free to decide about the type and extent of the investigation. For minor events the commissioner passes the investigation of the accident circumstances and/or accident cause on to employees of the EBA. Only in case of extraordinary damage, complex accident causes or special public interest the commissioner himself will supervise the investigation.

Dangerous events in railway traffic are investigated by both the railway company, carrying out their legal duty to do so and by the EBA, according to the statutory order. The results of the accident investigation should only be used for the prevention of reoccurrences by providing safety advice for the railway companies involved and for the responsible national and international authorities. The determination of liability is not among the tasks of the EBA. In cooperation with the judicial investigation, the EBA staff have the right to access the railway companies' property, enter the railway vehicles, safeguard evidence, confiscate objects or data, demand information, and in case of danger, take measures for the compliance with regulations.

The internal structure of the EBA should allow an independent, objective investigation because it has direct access to EBA's own experts and it is not dependent on the railway company's employees. Furthermore, the investigation is separated from the internal organisation units and is assigned to a special staff unit. The director of this unit reports directly to the president of the supreme federal authority EBA. The commissioner for the accident investigation of the EBA decides for which investigated cases and at what time he will write an investigation report. Detailed information on dangerous events are only given to other interested authorities. The EBA's press officer gives information to the public. EBA is not obliged by law to regularly publish statistical data and there is no data available for the public about the accident statistics.



Established	1994
Legal form of the body	Federal authority
Current status	1994; Directive 2004/49/EC
Relation to the public powers	<i>nav</i>
Budget	<i>nav</i>
Personnel	<i>nav</i>
Events notified	<i>nav</i>
Events investigated	<i>nav</i>
Reports published	<i>nav</i>

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	no
Liberty to investigate	yes
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the State of design of the vehicle	<i>nap</i>
Investigation accessible to observers of the State of manufacture	yes
Investigation accessible to observers of the State of occurrence	yes
Investigation accessible to observers of the State of operator	yes
Investigation accessible to observers of the State of registry	yes
Investigation accessible to observers of other substantially interested State	<i>nav</i>
Investigation accessible to observers of other interested organisations	yes
Diverging comments of the observers published	no
Findings are public	no
Reports published without further scrutiny	yes
Respect of the anonymity	yes

## 2.4. BASt – Federal Road Research Institute Accident & FAT – Automotive Industry Research Association

Accident trends are presented annually based on the official accident statistics of the Federal Institute of Statistics (see 2.6 – Federal Statistical Office). These accident statistics use the data from the police accident reports. Unfortunately the information about how accidents occur, the cause of the accident and the injury mechanisms is limited. Therefore in 1973, the Bundesanstalt für Straßenwesen or BASt (Federal Road Research Institute; <http://www.bast.de>) established an independent in-depth accident investigation team, the Accident Research Unit (ARU) at the Medical University of Hanover (MUH) (<http://www.mh-hannover.de/forschung/unfallforschung/index.htm>).

The work of ARU developed into a long term on-scene accident research study. In order to collect representative results the study is conducted in the entire Hanover region. Hanover region well represents the whole of Germany in terms of road coverage and in terms of percentage of urban and rural areas. The study area covers both the municipality of Hanover and the surrounding rural areas. There are approximately 1.2 million residents in this area and covers an area of roughly 2289 km<sup>2</sup> with some 10% designated as urban.

In 1999 the accident research team from the Federal Road Research Institute (BASt) together with the Automotive Industry Research Association (FAT) created the joint project known as German In-Depth Accident Study (GIDAS). This project extends the geographical area covered by the study. A second team was also set up in the Dresden area at the technical university of Dresden (<http://www.tu-dresden.de>).

The Accident Research Units in Hanover and Dresden investigate accidents involving injury and collect the data in a database. The ARU is notified by the local police and rescue services. The accident investigation teams (one medic and two technicians) use two specially equipped vehicles with flashing blue lights. They go to the accident site and investigate the cases following detailed procedures. The accident investigations take place daily during two six-hour shifts following a 2-week cycle during which the shift is changed.

In order to avoid any bias in the database, the collected data is compared to the official accident statistics for the respective areas and weighting factors are calculated.

The two centers investigate about 2000 accidents per year. The collected data includes information on environmental conditions; road design; traffic control; accident details and cause of the accident; crash information e.g. driving and collision speed, delta-v and EES, vehicle deformation; impact contact points for passengers or pedestrians; technical vehicle data; detailed injury information; information relating to the people involved such as weights and height etc. Approximately 500 to 3000 pieces of information per accident are obtained in total.



Medical confidentiality and the rights of the individuals are guaranteed. The data is stored anonymously in the database using SIR (Scientific Information Retrieval) software. The collected data is used in various ways. Legislators can study the accident cases in detail to identify and quantify future areas for legislative action and to recognize negative developments in advance. Both the automotive industry and the BAST can compare real accident situations to crash tests. Feedback regarding road traffic engineering can be obtained (such as assessing the severity of collisions between vehicles and road side objects).

Monthly and yearly reports give an overview of the investigated cases and allow comparisons to be made between the centers in Hanover and Dresden regarding types of vehicle and road users, the severity of the accident, etc. In addition, special reports are produced on topical issues containing recommendations for improving safety.

A steering committee, consisting of representatives from FAT, BAST, MUH and TUD (Technical University of Dresden) coordinate and manage the wide range of activities involved in the project. The data of the accident cases is available in aggregated or disaggregated form. While the MUH and the TUD are independent organisations, the Accident Research Units are not financially independent.

Established	1973 (Hanover), 1999 (Dresden)	
Legal form of the body	attached to the public bodies Medical University of Hannover (MUH) and Technical University of Dresden (TU Dresden)	
Current status	<i>nav</i>	
Relation to the public powers	<i>nav</i>	
Budget	2 M€	
Personnel	20 – 30	
Events notified (2003)	1200 (MUH); 800 (TU Dresden)	
Events investigated (2003)	1000 (MUH); < 800 (TU Dresden)	
Reports published (2003)	<i>nap</i>	
<i>Structural independence:</i>		
Separate from the market authority		yes
Separate from the operations authority		no
Separate from the safety authority		yes
Permanence of the investigating body		yes
Safety investigation's legal status		no
Safety investigator's legal status		no
Liability issues excluded		yes
Findings cannot be used for the purposes of the judicial enquiry		yes
<i>Financial independence:</i>		
Financial autonomy of the investigating body		no
Financial autonomy to carry out investigations		yes
Absence of relations to the industry (constructors, operators or others)		no
<i>Functional independence:</i>		
Obligation to investigate		no
Liberty to investigate		yes
Autonomous determination of the scope of the investigation		no
Autonomous determination of the methods of investigation		yes
Access to the evidence		no
Access to the witnesses		no
Investigation accessible to observers of the State of design of the vehicle		yes
Investigation accessible to observers of the State of manufacture		yes
Investigation accessible to observers of the State of occurrence		yes
Investigation accessible to observers of the State of operator		<i>nap</i>
Investigation accessible to observers of the State of registry		yes
Investigation accessible to observers of other substantially interested State		<i>nap</i>
Investigation accessible to observers of other interested organisations		<i>nap</i>
Diverging comments of the observers published		<i>nap</i>
Findings are public		no
Reports published without further scrutiny		<i>nap</i>
Respect of the anonymity		yes

## 2.5. DEKRA

The DEKRA cooperation (<http://www.dekra.de>) is a German forensic expert association which provides an international service with a European focus. The company is predominantly in the business of providing safety and quality for people dealing with technology, the environment and mobility. The DEKRA organisation has the following four subdivisions: Automotive, Industrial, Qualification and consulting, and International Operations. With more than 6000 employees the automotive division is the biggest of the four. A large part of the DEKRA automotive division is the vehicle experts. The vehicle experts produce about 1 million appraisals per year for private customers, insurers, police authorities and courts.

As part of the accident research DEKRA collects data from the accident appraisals and reconstructions (usually by order of the court) by their own experts and stores it in a database. The collected data consists of accident facts, information of the accident reconstruction and from the police documents. This database is used for DEKRA-internal purposes only. Therefore external users cannot access this data and an exact description of the database with its contents is not possible.

Established	1925	
Legal form of the body	Business establishment	
Current status	<i>nap</i>	
Relation to the public powers	Investigations by request of the public attorney's office	
Budget	<i>nav</i>	
Personnel	6000 (DEKRA Automotive)	
Events notified	<i>nap</i>	
Events investigated	<i>nap</i>	
Reports published	<i>nap</i>	
<i>Structural independence:</i>		
Separate from the market authority		yes
Separate from the operations authority		yes
Separate from the safety authority		yes
Permanence of the investigating body		yes
Safety investigation's legal status		yes
Safety investigator's legal status		yes
Liability issues excluded		yes
Findings cannot be used for the purposes of the judicial enquiry		no
<i>Financial independence:</i>		
Financial autonomy of the investigating body		yes
Financial autonomy to carry out investigations		yes
Absence of relations to the industry (constructors, operators or others)		no
<i>Functional independence:</i>		
Obligation to investigate		no
Liberty to investigate		no
Autonomous determination of the scope of the investigation		no
Autonomous determination of the methods of investigation		yes
Access to the evidence		yes
Access to the witnesses		no
Investigation accessible to observers of the State of design of the vehicle		<i>nap</i>
Investigation accessible to observers of the State of manufacture		<i>nap</i>
Investigation accessible to observers of the State of occurrence		<i>nap</i>
Investigation accessible to observers of the State of operator		<i>nap</i>
Investigation accessible to observers of the State of registry		<i>nap</i>
Investigation accessible to observers of other substantially interested State		<i>nap</i>
Investigation accessible to observers of other interested organisations		<i>nap</i>
Diverging comments of the observers published		<i>nap</i>
Findings are public		no
Reports published without further scrutiny		<i>nap</i>
Respect of the anonymity		no

## 2.6. STBA – Federal Statistical Office and Police

Traffic accidents are largely recorded by the police for the forensic collection of evidence as well for statistical documentation. The Federal Statistical Office (Statistisches Bundesamt STBA) publishes annually the data. For the past few years access via the internet is also possible.

The legal basis for the data collection the law on the statistics of road traffic accidents (Statistik der Straßenverkehrsunfälle) dated Jun 15th, 1990 (BGBl. I 1990, pp 1078). Accordingly, a federal statistic is established for all accidents where people died or were injured due to traffic on public roads and squares or where material damage occurred. According to the law on traffic accident statistics (Straßenverkehrsunfallstatistikgesetz) the German National Office of statistics only records accidents due to vehicle traffic. Therefore, accidents involving only pedestrians are not included in the statistics. Until the end of December 1994 only accidents causing material damage exceeding the limit of 4 000 DM ( $\approx$  2 000 €) for one participant were taken into account. Since then the criteria is that there has to be at least one tow away vehicle as a result of the accident.

The police records traffic accident causes since 1975. In Germany road accidents are investigated by the police of the respective region. In some major cities there is a special police unit (VUD Verkehrsunfalldienst) usually with specially trained officers that investigate only traffic accidents.

Every time a road accident occurs and the police are informed, the accident will be investigated. The accident investigation results in a standard computerised police report. Thus a police report always contains the same set of basic information, but can include additional information. In some states for example there is information about airbag deployment or seatbelt use which may not be there in other states. The report data includes information about the vehicles (vehicle data, basic damage information, etc.), the environment and the weather (road and traffic information), the involved persons (personal details, basic injury information, drivers license, alcohol, drugs, etc), the accident scene (in major accidents also a photo report) and the circumstances of the accident. Selected accident data is given to the international network of police reported accident data IRTAD.

In the state of Lower Saxony the police feed from these accident reports the database within the computerised information system, which in the state of Lower Saxony is called NIVADIS. This database contains information about all police work issues including also criminological events and one section of the database is created especially for traffic accidents.



### 3. Accident investigation in France

There are four dedicated accident investigation bodies in France. Their mission consists in investigating transport accidents and subsequent to the investigation, formulating safety recommendations. The first one of these bodies is the *Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile* or BEA (<http://www.bea-fr.org/>) for investigation of civil aviation accidents and incidents, established in 1946. The second body is the *Bureau d'enquêtes sur les événements de mer* or BEAmer (<http://www.beamer-france.org/>) for investigation of events at sea, established in December 1997. The third body is the *Bureau enquêtes accidents défense* or BEAD ([http://www.defense.gouv.fr/sites/defense/decouverte/le\\_ministere/organismes\\_relevant\\_du\\_ministre/bead](http://www.defense.gouv.fr/sites/defense/decouverte/le_ministere/organismes_relevant_du_ministre/bead)) for investigation of military and state aviation accidents and incidents, established in September 2002. The fourth body is the *Bureau d'enquêtes sur les accidents de transport terrestre* or BEA-TT for investigation of land transport accidents, established in January 2004.

One of these bodies, the BEAD, investigates aviation accidents and incidents associated with the operation of an aircraft “*designed exclusively for military use, that is operated for military purposes or that is the property of a state, and not registered as a civil aircraft*” (Bureau enquêtes accidents défense, 2004; translation from the French original). Indeed, the Chicago Convention (ICAO, 1944), the legal international basis for accident investigation in the field of *civil aviation*, does not apply to state aircrafts. Nevertheless, having regard to the evolutions in civil aviation, a report addressed to the French Minister of Defence, on the processing of the military aviation accidents and incidents recommended in 1999 the establishment of a dedicated accident investigation body for state aircrafts. In 2002, the Ministry of Defence decided to establish the BEAD. It became operational in January 2003 and has personnel of 27. In the following overview of the French accident investigation bodies, we will not consider the BEAD in further detail. The main reasons for this are that, the Chicago Convention and the Council Directive 94/56/EC concern only the investigation of civil aviation accidents and incidents, and that despite the previous, the general organisation of a BEAD investigation is identical to a BEA civil aviation investigation.

The three civilian BEAs are all attached to the Ministry of Transport. The BEA civil aviation and the BEAmer both have a web site, with a large amount of information both in French and in English. The BEA-TT does not have a web site of its own, but its reports can be consulted on one of the web sites of the Ministry of Transport ([http://www2.equipement.gouv.fr/rapports/archive\\_r/trans\\_r.htm](http://www2.equipement.gouv.fr/rapports/archive_r/trans_r.htm)).

In addition to these dedicated accident investigation bodies, three other entities investigate transport accidents. A recent ministerial order, authorising some organisations to access to the charge sheet of an on-going judicial enquiry, for the purposes of technical investigation or scientific research, gives a rather



official list of these organisations. Therefore, the fifth investigating body is *Institut National de Recherche sur les Transports et leur Sécurité* or INRETS (<http://www.inrets.fr>), attached to the Ministries of Research and Transport, established in 1985. The sixth is *Service Technique des Remontées Mécaniques et Transports Guidés* or STRMTG (<http://rp.equipement.gouv.fr/strmtg/>), attached to the Ministry of Transport, established in 1979. The seventh is *Centre européen d'études sur les accidents et l'analyse des risques* or CEESAR, an association under the French law of 1901, established in 1996.

### 3.1. BEA civil aviation

BEA civil aviation (<http://www.bea-fr.org/>) is a permanent, independent accident investigating body. BEA civil aviation was established in 1946 and it gained its current status in 2001. It *"carries out investigations and issues its reports in a completely independent manner"* (Bureau d'Enquêtes et d'Analyses, no date (b)). The BEA civil aviation does not receive nor does it ask for instructions from any authority.

The Minister responsible for the civil aviation (the Minister of Transport) appoints the director of the BEA civil aviation on the proposal of the head of the General Inspectorate for civil aviation for a period of 7 years. The director is a category A civil servant<sup>13</sup> with at least 20 years of experience in the field of civil aviation. The director has authority over the personnel of the BEA civil aviation and decides of its organisation. BEA civil aviation is attached to the General Inspectorate for civil aviation, which is a part of the Ministry of Transport. It is separate from the Civil Aviation Authority (DGAC), responsible for the civil aviation safety regulations. It can, *"on its own authority, call upon the assistance of the Civil Aviation Authority (DGAC), the Ministry of Defence, the Meteorological Service, industrial groups, shippers and other professionals"* (Bureau d'Enquêtes et d'Analyses, no date (b)).

The BEA civil aviation has an obligation to investigate all accidents and serious incidents as defined by the Council Directive 94/56/EC<sup>14</sup>. A BEA investigation aims solely to determine the circumstances, the causes or probable causes of the investigated event and the issuing of safety recommendations destined to improve aviation safety. The director of the BEA civil aviation decides the scope and the methods of investigation. The Minister of Transport can appoint an *ad hoc* commission to assist the BEA in an investigation of an accident. This commission is subject to the same legal framework as the BEA itself.

BEA civil aviation has permanent staff of 110 persons, out of which 40 investigators<sup>15</sup> and investigative assistants, in Le Bourget near Paris. The BEA investigators have an immediate access to the site of an accident or an incident. They can take any necessary actions to preserve and safeguard evidence. The

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<sup>13</sup> "Category A civil servant" means a civil servant appointed as a result of a recruitment process, that includes a competitive exam and that is open to persons having at least 3 years of higher education marked by a diploma.

<sup>14</sup> An accident means *"an occurrence associated with the operation of an aircraft which takes place between the time a person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which: a person is fatally or seriously injured, the aircraft sustains damage or structural failure, the aircraft is missing or is completely inaccessible"*.

An incident means *"an occurrence, other than an accident, associated with the operation of an aircraft which affects or would affect the safety of operation"*.

In other words, BEA civil aviation uses the standard ICAO definitions.

<sup>15</sup> Décret n°2001-1043 defines an "investigator" as a category A civil servant or, if the person is not a civil servant, having equivalent qualifications. An "investigator" therefore has a diploma that marks the successful conclusion of at least 3 years of higher education.

BEA duty team starts its investigation once it has been notified of an accident or an incident. In France, the notification of civil aviation accidents and incidents is mandatory. However, if the BEA has not been notified of an accident or an incident, it can seize itself<sup>16</sup> and take any necessary steps.

The first person to go to a site of an accident is a field investigator. A field investigator is a civil aviation officer attached to the local office of the DGAC, whose task is to preserve and safeguard the evidence and to make initial observations. *"According to the information notified and the first contacts between the investigator and the duty team, a decision is taken as to whether a BEA investigator or a BEA team is dispatched immediately. According to the type of case, investigations are conducted by a specially designated investigator, possibly backed up by a team of investigators or investigative assistants, or by the duty team with the assistance of the Field Investigator"* (Bureau d'Enquêtes et d'Analyses, no date (a)).

The BEA investigators have access to any information or document relevant to the investigation, including the evidence seized for the purpose of a judicial inquiry. The BEA investigators can remove the flight recorders, even if there is no judicial inquiry, only in presence of an officer of the Criminal Investigation Department. The investigators have access to the results of the analysis conducted for the judicial inquiry. The investigation report is published. The anonymity of those involved in the accident is respected. All BEA reports contain a warning concerning their use. The following can be found in the Concorde accident report. *"This report presents the technical conclusions reached by the BEA on the circumstances and causes of this accident. In accordance with Annex 13 of the Convention on International Civil Aviation, with EC Directive 94/56 and with Law No 99-232 of 29 March 1999, the analysis of the accident and the conclusions and safety recommendations contained in this report are intended neither to apportion blame, nor to assess individual or collective responsibility. The sole objective is to draw lessons from this occurrence, which may help to prevent future accidents or incidents."* (Bureau d'Enquêtes et d'Analyses, 2002)

The addressees have 90 days, counting from the day of reception of the safety recommendations, to inform the BEA about the actions they intend to take as a result of those recommendations and, if necessary, about the delays required to their implementation.

The BEA also has a unit gathering information on minor general aviation incidents. This unit, REC, receives some 150 letters a year. The REC investigators verify the information (event scenarios) these letters contain and then enter it into a database. The REC unit uses the information when it edits the REC Info bulletin. The information can also sometimes be used as material

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<sup>16</sup> A BEA investigator told us about an incident involving only one person. BEA learned about the incident from an article in the specialised press. The person involved in the incident had not reported it.

for studies on various subjects related to safety, such as gliding, mid-air collisions, fuel starvation etc.

The BEA publishes 100-150 ICAO reports a year. All recent reports and statistics are available on the BEA web site. An Information Bulletin on general aviation accidents and incidents is published monthly; in 2003 this bulletin presented 98 incidents. A new bulletin on air transport incidents was published twice in 2004; it presented 10 incidents. Earlier air transport incident reports figure on the BEA web site. In 2003 the BEA published also two studies. The REC Info is published 9 times a year; in 2003 it presented 44 events. Finally, the annual report gives an overview of the BEA's activities.

Established	1946
Legal form of the body	Public authority, attached to the Ministry of Transport
Current status	2001; Annex 13 of the Chicago Convention; Directive 94/56/EC; Loi n°99-234 of 29/3/1999; Décret n°2001-1043 of 8/11/2001
Relation to the public powers	The Minister of Transport appoints the Director for a renewable 7 year term
Budget (2004)	3,4 M€
Personnel (2004)	110 of which 30 investigators and 10 investigative assistants
Events notified	750 (average per year)
Events investigated	300-350 (per year)
Reports published	100-130 (per year)

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	yes
Liberty to investigate	yes
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the state of design of the vehicle	yes
Investigation accessible to observers of the state of manufacture	yes
Investigation accessible to observers of the state of occurrence	yes
Investigation accessible to observers of the state of operator	yes
Investigation accessible to observers of the state of registry	yes
Investigation accessible to observers of other substantially interested state	yes
Investigation accessible to observers of other interested organisations	no
Diverging comments of the observers published	yes
Findings are public	yes
Reports published without further scrutiny	yes
Respect of the anonymity	yes



### 3.2. *BEA*mer – French Marine Investigation Office

The French Marine Investigation Office or *BEA*mer (<http://www.beamer-france.org/>) is a permanent, independent accident investigating body. *BEA*mer was established in 1997 and it gained its current status in 2002. It is "*working independently of any governmental agencies responsible for safety at sea*" (*BEA*mer, 2003c). The *BEA*mer does not receive nor does it ask for instructions from any authority or any other organisation whose interests might be contradictory with its mission.

The Minister of maritime affairs appoints the director of the *BEA*mer on the proposal of the head of the General Inspectorate for maritime affairs for a period of 5 years. The director is a class A civil servant with at least 20 years of experience in the fields of maritime affairs and maritime security. The director has authority over the personnel of the *BEA*mer. *BEA*mer is an attached to the General Inspectorate for maritime affairs, which is a part of the Ministry of Transport. It is separate from the Maritime Affairs Authority (DAMGM), responsible for the maritime safety regulations. For each investigation, the *BEA*mer can call upon additional specialised investigators. On its own authority, the *BEA*mer can call upon the assistance of all government departments.

A *BEA*mer investigation is initiated by a decision of the Minister of maritime affairs, on his/her own initiative or on the proposal of the director of the *BEA*mer. A *BEA*mer investigation aims solely to determine the circumstances, the causes or probable causes of the investigated event<sup>17</sup> and the issuing of safety recommendations destined to improve maritime safety. The director of the *BEA*mer decides the scope and the methods of investigation and proposes to the Minister of maritime affairs, either to conduct an investigation by the own means of *BEA*mer or the constitution of an *ad hoc* commission. In the latter case, the minister of maritime affairs appoints, on the proposal of the director of the *BEA*mer, the president and the members of the commission. This commission is subject to the same legal framework as the *BEA*mer itself.

*BEA*mer has permanent staff of 6 persons, out of which 4 are investigators<sup>18</sup>, in Paris and it has representatives in the provinces. *BEA*mer also has a scientific council advising it in security matters. The *BEA*mer investigators have an immediate access to the site of an event. They can take any necessary actions to preserve and safeguard evidence.

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<sup>17</sup> The *BEA*mer web site does not give a definition of a sea event. However, the site does state that "*the objective of the technical inquiries of BEAmer is neither to determine nor to attribute civil or penal liabilities, but "to establish the circumstances relevant to the casualty and to look for the causal factors, in order to improve maritime safety".*" (*BEA*mer, 2003a) Furthermore, the site states that *BEA*mer acts in accordance with the *Resolution A849/20 : Code for the investigation of marine casualties and incidents* adopted on November 27<sup>th</sup>, 1997 by the International Maritime Organisation. Therefore, *BEA*mer uses the standard IMO definitions.

<sup>18</sup> Décret n°2004-85 defines an "investigator" as a category A civil servant or having equivalent qualifications. An "investigator" therefore has a diploma that marks the successful conclusion of at least 3 years of higher education.

The *BEA*mer investigators have access to any information or document relevant to the investigation, including the evidence seized for the purpose of a judicial inquiry. The *BEA*mer investigators can remove the data recorders, even if there is no judicial inquiry, only in presence of an officer of the Criminal Investigation Department. The investigators have access to the results of the analysis conducted for the judicial inquiry. The investigation report is published. The anonymity of those involved in the accident is respected. All *BEA*mer reports contain a warning concerning their use. The English translation of the Erika report (*BEA*mer, 2000) contains the following warning: *“In accordance with the provisions of IMO Resolutions No. A849(20) of 27/11/97 and No. A884(21) of 25/11/99 as well the decree of 20/01/81 concerning commissions of enquiry into marine casualties and incidents, this report does not seek to apportion blame, or determine civil or criminal liability. Its only aim is precautionary and seeks to avoid a repeat occurrence of the same type of casualty. Consequently, the use of this report for purposes other than prevention could lead to mistaken interpretations.”*

The addressees have 90 days, counting from the day of reception of the safety recommendations, to inform the *BEA*mer about the actions they intend to take as a result of those recommendations and, if necessary, about the delays required to their implementation.

The *BEA*mer also conducts specific studies on certain types of sea events. These safety related analysis *“are based on statistical data compiled by BEAmer, as well as on the expertise of its staffmembers, investigators and specialists of the maritime world.”* (*BEA*mer, 2003b) The *BEA*mer website proposes three studies on collisions between fishing boats and merchant ships (2001), evacuations of fishing boats (2002) and running aground of fishing boats or merchant ships (2003).

Established	1997
Legal form of the body	Public authority, attached to the Ministry of Transport
Current status	2004; IMO Code 27/11/1997; Directive 1999/35/EC; Loi n°2002-3 of 3/1/2002; Décret n°2004-85 of 26/1/2004
Relation to the public powers	The Minister of Transport appoints the Director for a renewable 5 year term
Budget (2003)	318 163 €
Personnel (2004)	6 of which 4 investigators
Events occurred	3000 (average per year)
Events investigated	200 (per year)
Reports published	40 (per year)

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	no
Liberty to investigate	no
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the state of design	no
Investigation accessible to observers of the state of manufacture	no
Investigation accessible to observers of the state of occurrence	no
Investigation accessible to observers of the state of operator	no
Investigation accessible to observers of the state of registry	no
Investigation accessible to observers of other substantially interested state	yes
Investigation accessible to observers of other interested organisations	no
Diverging comments of the observers published	no
Findings are public	yes
Reports published without further scrutiny	yes
Respect of the anonymity	yes



### 3.3. BEA-TT

BEA-TT is a permanent, independent accident investigating body. It is competent in rail, road, tracked transports, transport by inland waterways and cableway accidents. BEA-TT was established in 2004. The BEA-TT does not receive nor does it ask for instructions from any authority or any other organisation whose interests might be contradictory with its mission.

The Minister of Transport appoints the director of the BEA-TT on the proposal of the vice-president of the council of the department of civil engineering (the president of the council being always the Minister of Transport) for a period of 5 years. The director is a class A civil servant with at least 20 years of experience in the fields of transports and infrastructure. The director has authority over the personnel of the BEA-TT. BEA-TT is attached to the council of the department of civil engineering, which is a part of the Ministry of Transport. It is separate from the Land Transport Authority (DTT), and Safety and Road Traffic Authority (DSCR), responsible for the safety regulations. For each investigation, the BEA-TT can call upon additional specialised investigators. On its own authority, the BEA-TT can call upon the assistance of all government departments.

A BEA-TT investigation is initiated by a decision of the Minister of Transport, on his/her own initiative or on the proposal of the director of the BEA-TT. In the field of rail transport, the Directive on safety on the Community's railways defines the accidents, which the BEA-TT shall investigate. A BEA-TT investigation aims solely to determine the circumstances, the causes or probable causes of the investigated accident or incident and the issuing of safety recommendations destined to improve the transport safety. The director of the BEA-TT decides the scope and the methods of investigation and proposes to the Minister of Transport, either to conduct an investigation by the own means of BEA-TT or the constitution of an ad hoc commission. In the latter case, the Minister of Transport appoints, on the proposal of the director of the BEA-TT, the president and the members of the commission. This commission is subject to the same legal framework as the BEA-TT itself.

BEA-TT has permanent staff of 9 persons, out which 6 are investigators<sup>19</sup>, in Paris. The BEA-TT investigators have an immediate access to the site of an accident or an incident. They can take any necessary action to preserve and safeguard evidence. BEA-TT relies on a surveillance network that informs it on accidents and incidents, which might interest BEA-TT.

The BEA-TT investigators have access to any information or document relevant to the investigation, including the evidence seized for the purpose of a judicial inquiry. The BEA-TT investigators can remove the data recorders, even if there is no judicial inquiry, in presence of an officer of the Criminal Investigation Department. The investigators have access to the results of the analysis

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<sup>19</sup> Décret n°2004-85 defines an "investigator" as a category A civil servant or having equivalent qualifications. An "investigator" therefore has a diploma that marks the successful conclusion of at least 3 years of higher education.

conducted for the judicial inquiry. The investigation report is published. The anonymity of those involved in the accident is respected. The addressees have 90 days, counting from the day of reception of the safety recommendations, to inform the BEA-TT about the actions they intend to take as a result of those recommendations and, if necessary, about the delays required to their implementation.

BEA-TT also conducts specific studies on certain types of accidents or incidents. These safety related analysis are based on data compiled by BEA-TT, on expertise of its staff members and specialists of different modes of land transport. BEA-TT has already conducted studies on spontaneous coach fires and on entering onto the motorway in contraflow direction.

In 2004, BEA-TT initiated 10 accident investigations. Before its establishment the number of investigations was significantly lower; varying from zero to four in 2002 and in 2003. Out of the 10 investigations in 2004, two concerned rail accidents and two road accidents, one concerned an accident with a train and a heavy goods vehicle; three concerned inland water transport accidents, one concerned a tracked transport accident and one a cableway accident. In the first months of 2005, BEA-TT has initiated an investigation on a road accident and a second investigation on a rail accident.

One of the 2004 accidents classified as a rail accident, involved the death by electrocution of a person having entered a “no entry zone” of a marshalling yard. The director of BEA-TT stated, in a discussion, that BEA-TT has an extremely wide sphere of operation, which is not only the result of being responsible for all land transports accident investigation. As in the case of electrocution, the Minister of Transport can launch an investigation on an accident that involves land transport facilities, but that is not strictly speaking a land transport accident.

Established	2004
Legal form of the body	Public authority, attached to the Ministry of Transport
Current status	2004; Directive 2004/49/EC (for rail only); Loi n°2002-3 of 3/1/2002; Décret n°2004-85 of 26/1/2004
Relation to the public powers	The Minister of Transport appoints the Director for a renewable 5 year term
Budget (2004)	240 000 €
Personnel (2004)	9 of which 6 investigators
Events notified	<i>nap</i>
Events investigated (2004)	10
Reports published (2004)	4

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from to the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate (rail)	yes
Liberty to investigate	no
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the state of design of the vehicle	no
Investigation accessible to observers of the state of manufacture	yes
Investigation accessible to observers of the state of occurrence	no
Investigation accessible to observers of the state of operator	yes
Investigation accessible to observers of the state of registry	yes
Investigation accessible to observers of other substantially interested state	no
Investigation accessible to observers of other interested organisations	no
Diverging comments of the observers published	<i>nap</i>
Findings are public	yes
Reports published without further scrutiny	yes
Respect of the anonymity	yes

### 3.4. INRETS – French National Institute for Transport and Safety Research

The French National Institute for Transport and Safety Research or INRETS (<http://www.inrets.fr>) is a public scientific and technological body. It was created by an inter-ministerial decree in 1985. INRETS' research activities cover all transport modes, but it is mainly road transport orientated. INRETS has three missions. Firstly, it organises, executes and assesses technological research and developments concerned with the improvement of the means and systems of transport and traffic, from technical, economic and social standpoints. Secondly, it carries out evaluative and advisory studies within these domains. Thirdly, it promotes the results of these research and study programs, contributes to the dissemination of scientific knowledge, and participates in training by and on transport research both in France and abroad.

INRETS is under the dual administrative supervision of the Ministry of Research and the Ministry of Transport. INRETS is administered by a board of directors composed of 21 board members. Nine are representatives of the transport professions (manufacturers and operators) jointly chosen by the Ministers of Research and Transport for three years; eight are representatives of the Ministries of Research, Transport, Security, Road Safety, Budget, Health, Industry, Defence and Interior; and four are representatives of INRETS personnel elected for three years. The two supervising Ministers appoint the president of the board among the representatives of the transport professions. The board deliberates on the general orientations and the program of the institute, its organisation and functioning as well as on its budget.

The President of the French Republic appoints the Director General of the Institute by a decree on the joint proposal of the two supervising ministers, for a renewable term of 3 years. The Director is "*chosen among the scientifically and technically competent personalities*" (France, 1985: §8). "*The Director General is assisted by the board of directors, the Secretary General and official representatives, who are responsible for the orientation, coordination and diffusion of the research programmes, and who act as advisors to the institute's 18 research units*" (INRETS, 2001). The Director has authority over the services of the institute and decides of its organisation. He appoints the Secretary General and the directors of the laboratories, the latter for a twice-renewable term of four years.

The scientific council is composed of "*ten personalities chosen for their competence in the fields of activity of the institute*" (France, 1985: §13) and of three representatives of the (research) personnel elected for two years. The ten personalities are appointed for a once-renewable term of four years by a decree of the two supervising ministers. The council participates to the scientific orientation of the body. The general director consults the scientific council on research programs, the creation, modification and shedding of laboratories and so forth. The Director General creates the laboratories, after hearing the scientific council. The laboratories are allocated a lump sum for their functioning, missions and equipment. Two thirds of the research that is



executed at INRETS deals with the physical sciences, and one-third with the social sciences. The activities of the Institute involve diverse fields such as economics, sociology, psychology, physiology, ergonomics, biomechanics, acoustics, mechanics, mathematics, computer sciences, electronics and electrotechnics. The diversity of approach used to carry out the different research programmes gives a multidisciplinary characteristic to the INRETS research teams.

INRETS has a permanent staff of 430, out of which about 40% work on road safety. For 2001-2004 the road safety was defined as one of the four strategic priorities of INRETS. The accident and injury causation and accident consequences were identified as a research domain inside this strategic axe. For 2005-2008 the road safety continues to be one of the INRETS priorities. The qualitative and quantitative accidentology, biomechanics and ergonomics, psychology and sociology of human behaviour will constitute the three research domains.

In accidentology for instance, the Department of Accident Mechanisms (MA at Salon-de-Provence, *département* of Bouches du Rhône) deals with in depth analysis of the mechanisms at the origin of accidents. Epidemiological Research and Surveillance Unit in Transport, Occupation and Environment (UMRESTTE at Bron, *département* of Rhône) conducts specific studies focussed on pedestrians and car occupants. While INRETS contributes to enhance road safety, the purpose of the investigations its laboratories conduct is not to determine the circumstances, the causes or probable causes of an investigated event and the issuing of safety recommendations destined to improve transport safety.

MA (<http://www.inrets.fr/infos/centres/paca/ma/mainindex.htm>) maintains a database of over 500 in-depth accident investigations and introduces to the base some 50 new cases per year. The case selection is dependent on the laboratory's study orientations: urban accidents, elderly people, accidents related to work and so forth. The cases are gathered from the urban areas of Salon-de-Provence and Aix-en-Provence.

UMRESTTE (<http://www.inrets.fr/ur/umrestte/index.htm>) works on the Rhône Register, which incorporates all road accident victims with physical injury in the Rhône *département* (1,5 million inhabitants) since 1995. The study orientations involve for instance the injury mechanisms and the injury consequences.

The INRETS accident investigators have access to the charge sheets dressed by the police and gendarmerie. The investigators have no guaranteed access to the evidence or the witnesses of a judicial inquiry. The MA investigators have arranged with the local fire fighters to receive the information on reported accidents, so that the investigators can get to the accident scene as rapidly as

possible. The MA investigators are only allowed to interview and work on the accident site by local arrangements with the police and gendarmerie<sup>20</sup>.

The UMRESTTE investigators work solely on the charge sheets, which contain a more or less precise indication about the accident location and the licence plate number(s), so that the victims injuries can be matched with the accident. They do not work on accidents that result in a judicial inquiry. The UMRESTTE investigators intervene 1-2 days after an accident and collect the necessary elements for the investigation. Once the information on the accident vehicle(s) and the information on the victims' injuries has been matched, the information will be made anonymous.

Neither MA nor UMRESTTE release reports on specific accidents.

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<sup>20</sup> A MA researcher told us about a case, where the officers on the accident scene did not know them and told the MA investigators to leave.

Established	1985
Legal form of the body	public scientific and technological body, attached to the Ministries of Research and Transport
Current status	1985; Décret n°85-984 of 18/9/1985; Arrêté of 3/5/2004
Relation to the public powers	The President of the Republic appoints the Director General for a renewable 3 year term
Budget	43 M€
Personnel	430 (189 researchers, 157 technicians and assistants)
Events notified	<i>nap</i>
Events investigated	<i>nap</i>
Reports published	<i>nap</i>

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from to the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	no
Safety investigator's legal status	no
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	<i>nap</i>

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	no
Liberty to investigate	yes
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	no
Access to the witnesses	no
Investigation accessible to observers of the state of design of the vehicle	<i>nap</i>
Investigation accessible to observers of the state of manufacture	<i>nap</i>
Investigation accessible to observers of the state of occurrence	<i>nap</i>
Investigation accessible to observers of the state of operator	<i>nap</i>
Investigation accessible to observers of the state of registry	<i>nap</i>
Investigation accessible to observers of other substantially interested state	<i>nap</i>
Investigation accessible to observers of other interested organisations	<i>nap</i>
Diverging comments of the observers published	<i>nap</i>
Findings are public	yes
Reports published without further scrutiny	<i>nap</i>
Respect of the anonymity	yes



### 3.5. STRMTG

Le Service Technique des Remontées Mécaniques et des Transports Guidés (technical service of cableways and tracked transports) or STRMTG (<http://www.equipement.gouv.fr/strmtg/>) is a permanent, technical service of the Ministry of Transport. It was created by Decree in 1979 and gained its current status in 1990. It is competent in the domains of cableways and tracked transports at the exclusion of the national railway system.

The Minister of transport appoints the Director of the STRMTG. The service is dependant on the Director of the Land Transports. The service prepares the technical regulations in its domains of competence. It controls all new equipment prior to its introduction on the national territory and the installations that are actually in operation on site. It participates in research and development activities along with other services of the Ministry and promotes technical innovation in France and in Europe. It is the national authority responsible for French statistics and databases on the state of the cableways, the traffic, the accidents and the investments. It approves equipment destined to the European market to comply with the Directive 2000/9/EC.

STRMTG divides accidents into three categories: the serious, the fatal and the other accidents<sup>21</sup>. The service investigates the serious and the fatal accidents. The notification of serious and fatal accidents is mandatory since 1999. Moreover, the service has access to the charge sheets dressed by the police and gendarmerie. A STRMTG investigation aims to determine the circumstances, the causes or probable causes of the investigated accident and the issuing of safety recommendations destined to improve the transport safety. In two cases, the BEA-TT has called for a STRMTG expert for an investigation on a cableway or tracked transport accident.

STRMTG has a permanent staff of 36, out of which 29 engineers or technicians, in Grenoble, *département* of Isère. It has a network of 8 local offices that control the installations in operation. STRMTG has access to the charge sheets dressed by the police and gendarmerie, but it does not have access to the evidence or the witnesses of a judicial inquiry. STRMTG does not publish reports on specific accidents. Every September STRMTG publishes a report on accidents occurred during the preceding "operating season". Before its publication, the report is submitted to the National Commission of Cableways. The Commission is composed of representatives of the industry, the operators and the consumer associations.

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<sup>21</sup> There are no international standards in this domain. The STRMTG definitions are the following. (STRMTG, 2002; GRUFFAZ, 2005)

A *serious accident* means an accident involving at least one fracture, loss of a limb or a hospitalisation for at least 6 days.

A *fatal accident* means an accident that is fatal within 30 days.

The STRMTG decided to investigate only the serious and fatal accidents, because the exploitation of their accident database became impossible due to the great number of less serious accidents.



STRMTG is the only European authority to publish such a report. According to the Director of the service, there are several reasons that can explain the fact that the other European authorities do not publish such reports. In some cases, there is no single national authority that would collect all the necessary information, in other cases the information is collected for other reasons than publishing an annual report on cableway and tracked transport accidents. However, the cableway authorities from 15 countries attend to an annual ITTAB meeting (Internationale Tage der Technischen Aufsichts-Behörden für Seilbahnen). The purpose of this meeting is to compare and discuss the events of the preceding year and the subsequent safety recommendations. These countries have adopted a standard form for declaring an accident in order to facilitate the comparisons.

STRMTG also works on incidents that might have, under slightly different circumstances, led to a serious or fatal accident. The service has invited the operators to dress a report of these incidents and address them to the Service. There is no legal obligation and some operators report very well, while others notify STRMTG only in case of serious or fatal accident.

Established	1979
Legal form of the body	Public authority, attached to the Ministry of Transport
Current status	1999; Arrêté of 18/12/1990; Arrêté of 1/10/1999; Arrêté of 3/5/2004
Relation to the public powers	The Minister of Transport appoints the Director
Budget	<i>nav</i>
Personnel	36 (18 engineers and 11 technicians)
Events notified (2002-2003)	22
Events investigated (2002-2003)	22
Reports published (IX/2003)	1

*Structural independence:*

Separate from the market authority	no
Separate from the operations authority	no
Separate from to the safety authority	no
Permanence of the investigating body	yes
Safety investigation's legal status	no
Safety investigator's legal status	no
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	no

*Financial independence:*

Financial autonomy of the investigating body	no
Financial autonomy to carry out investigations	no
Absence of relations to the industry (constructors, operators or others)	no

*Functional independence:*

Obligation to investigate	yes
Liberty to investigate	yes
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	no
Access to the witnesses	no
Investigation accessible to observers of the state of design	no
Investigation accessible to observers of the state of manufacture	no
Investigation accessible to observers of the state of occurrence	<i>nap</i>
Investigation accessible to observers of the state of operator	<i>nap</i>
Investigation accessible to observers of the state of registry	<i>nap</i>
Investigation accessible to observers of other substantially interested state	no
Investigation accessible to observers of other interested organisations	no
Diverging comments of the observers published	no
Findings are public	yes
Reports published without further scrutiny	no
Respect of the anonymity	yes



### 3.6. CEESAR

Centre Européen d'Etudes sur les Accidents et l'analyse des Risques or CEESAR is a non-profit association under the French law of 1901. CEESAR was created in 1992. Its objectives are, within the limits fixed by ethics, to exchange knowledge in order to reduce the number and severity of road accidents, to do research and experiments related to road safety, to train future road safety researchers and contribute to road safety education.

Among the association's members figure universities and business schools, automobile constructors, car parts manufacturers, insurance companies and personalities of medicine and industry. The members elect a board of governors. The board decides on the orientations of the activity of the association assisted by a scientific council. A chief representative directs the association's activities.

CEESARs annual budget is around 2,5 M€. As a private structure, CEESAR is dependant on external financing for the conduct of its activity. The French automobile constructors finance a big part of CEESARs research activities. While CEESARs global objective is to enhance road safety, the purpose of the investigations it conducts is not to determine the circumstances, the causes or probable causes of the investigated event and the issuing of safety recommendations destined to improve transport safety. In one case, the BEA-TT has sub-contracted CEESAR for a technical expertise on an investigation on a road transport accident.

CEESAR has a permanent staff of 40 persons on three different locations. 30 are in Nanterre near Paris. The two other locations are in the *département* of Eure, west of Paris and in the *département* of Somme, north of Paris. The association has three research departments. DESA focuses on accidentology, DPEB on biomechanics and DESC on human behaviour. DESA works on primary, secondary and tertiary safety. DESA shares with the INRETS laboratory MA a common methodology for the in-depth analysis of the mechanisms at the origin of accidents. DESA does some 100 cases each year. DESA also works on injury causation and participates on different European projects, such as MAIDS, EACS and ETAC.

The DESA in-depth cases are gathered in three *départements*, in Essonne, south of Paris, and in Eure and Somme. The injury causation cases are gathered mainly in the *départements* of Essonne, Yvelines, west of Paris, and in Somme. The CEESAR accident investigators have access to the charge sheets dressed by the police and gendarmerie. The investigators have no guaranteed access to the evidence or the witnesses of a judicial inquiry. The investigators have arranged with the local fire brigades to receive the information on reported accidents, so that the investigators can get to the accident scene as rapidly as possible. The investigators are only allowed to interview and work on the accident site by local arrangements with the police and gendarmerie.

CEESAR does not release reports on specific accidents.



Established	1992	
Legal form of the body	A non-profit association under the French law of 01/07/1901	
Current status	Arrêté of 3/5/2004	
Relation to the public powers	<i>nap</i>	
Budget	2,5 M€	
Personnel	40	
Events notified	<i>nap</i>	
Events investigated	<i>nap</i>	
Reports published	<i>nap</i>	
<i>Structural independence:</i>		
Separate from the market authority		yes
Separate from the operations authority		yes
Separate from to the safety authority		yes
Permanence of the investigating body		yes
Safety investigation's legal status		no
Safety investigator's legal status		no
Liability issues excluded		yes
Findings cannot be used for the purposes of the judicial enquiry		<i>nap</i>
<i>Financial independence:</i>		
Financial autonomy of the investigating body		yes
Financial autonomy to carry out investigations		no
Absence of relations to the industry (constructors, operators or others)		no
<i>Functional independence:</i>		
Obligation to investigate		no
Liberty to investigate		yes
Autonomous determination of the scope of the investigation		yes
Autonomous determination of the methods of investigation		yes
Access to the evidence		no
Access to the witnesses		no
Investigation accessible to observers of the state of design of the vehicle		<i>nap</i>
Investigation accessible to observers of the state of manufacture		<i>nap</i>
Investigation accessible to observers of the state of occurrence		<i>nap</i>
Investigation accessible to observers of the state of operator		<i>nap</i>
Investigation accessible to observers of the state of registry		<i>nap</i>
Investigation accessible to observers of other substantially interested state		<i>nap</i>
Investigation accessible to observers of other interested organisations		<i>nap</i>
Diverging comments of the observers published		<i>nap</i>
Findings are public		no
Reports published without further scrutiny		<i>nap</i>
Respect of the anonymity		yes

### 3.7. BAAC – National road accident data

The French national road accident data is based on the BAAC (Bulletin d'Analyse des Accidents Corporels de la Circulation) standard forms filled out by the police forces<sup>22</sup> on every traffic accident involving injury. The information for BAACs are drawn from the police reports. The police forces send the BAAC data to ONISR (Observatoire national interministériel de sécurité routière) Under the responsibility of ONISR, the services of Ministry of Transports control the quality of the data, for instance identifies duplications and other anomalies. The national database produces general statistical information on road safety. It does not contain sufficient data on accident or injury causation for research purposes. It is however useful for macro-social level research.

The national data suffers from several biases. In 2003 the number of fatalities at 6 days<sup>23</sup> was estimated 4 to 10 per cent higher than the official figures (Laumon, Verney and Gadegbeku In Laumon; 2002). The rate of under-reporting and under-recording concerning the victims could be as high as 60%. The severity of injuries does not match with the hospital data. Minor injuries do not always figure in the BAAC and therefore the national data exaggerates the average severity of injuries. There is also a discrepancy with the definition of injury severity. Injuries assessed as "minor" by the police usually are minor from the medical point of view. Likewise, injuries assessed as "major" usually are medically speaking major. There is nevertheless a serious margin of error. Laumon and Martin (In Laumon, 2002) estimate that as much as 50% of police estimated seriously injured are in fact not seriously injured in the medical sense. Another well-identified problem concerns the accident location. The national data on accidents outside constructed areas fails in 50% of the cases to locate the accident site within 100 metres of the actual accident site and in 39% within a kilometre (Miquel, 2002).

Based on comparisons with the Rhône Road Trauma Register, which collects all hospital data relevant to road accidents from the Rhône *département* for research purposes, the BAAC data under-reporting and under-recording rate is around 60% and depends on the following variables:

1. the actual medical injury severity,
2. the presence or absence of a third party,
3. the police force in charge of the investigation,
4. the type of road user.

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<sup>22</sup> The different police forces are police, gendarmerie and CRS. For the purposes of this deliverable, they can be differentiated as follows: the first operate in urban areas, the second in rural areas and the third on roads.

<sup>23</sup> France adopted the standard definition of 30 days for counting traffic fatalities in 2004.

The differences in injury classification between the police –based theoretically on the duration of hospitalisation– and the hospitals –based on the actual injuries and their severity– in Rhône *département* are dependant on:

1. the age of the victim,
2. the type of road user,
3. the type of accident,
4. the investigating police force,
5. the year the accident happened,
6. the actual medical injury severity.

Unfortunately, the Rhône Register data does not give a reliable indication of the national situation since its validity is limited in geographical scope. Rhône *département* has a population of 1,6 millions. The extension of the Register to the whole Rhône-Alpes Region, whose population is 5 millions, is under consideration. Nevertheless, the procedures for extrapolating the Rhône Register data to national level are under development.

The in-depth accident investigations by CEESAR or INRETS-MA have a similar disadvantage. While they allow a better understanding of the accident and injury causation, they remain case studies and the drawing of national conclusions would be extremely hazardous.

## 4. Accident investigation in Italy

At present, in Italy there is only one dedicated accident investigation body. This is Agenzia Nazionale per la Sicurezza del Volo or ANSV (National Agency for Flight Safety), established in 1999.

For maritime, rail and road transport, no dedicated accident investigation bodies exist.

For maritime accidents, the Maritime Authority carries out accident investigations. Maritime Authority is located all over the national coastal strip by means of harbour-offices, maritime district offices and maritime local offices.

For rail accidents, the responsibility for technical investigation of accidents that occur on the Italian rail network lies with the Ministry of Infrastructure and Transport. In case of accident, experts from both RFI and the Ministry of Infrastructure and Transport constitute a special Commission, in cooperation with judicial authorities. The Directive 2004/49/EC of the European Parliament and of the Council provides for the establishment of independent investigation bodies in each Member State. In accordance with this Directive, Italy will soon establish an investigating body for rail.

There is no dedicated, independent body for road accident investigation. Article 11 of Italy Road Rules states that the law enforcement authorities must conduct accident investigation and that this investigation is mandatory, albeit the will of the involved parties. Police authorities therefore investigate all road accidents.

The authorities in charge of accident investigation are Police, Road Police, Carabinieri, Guardia di Finanza and Municipality Police within the borders of their municipality. The accident investigation aims at acquiring all elements – related to the accident itself and to the environment– that allow the reconstruction of the accident. The purpose of the investigation is to determine the responsibilities of the involved persons.

## 4.1. ANSV – National Agency for Flight Safety

The legislative decree n.66 of the 25th of February 1999, established Agenzia Nazionale per la Sicurezza del Volo or ANSV (National Agency for Flight Safety; <http://www.ansv.it/>) according to the provisions defined by EC directive n. 94/56/CE of the 21st of November 1994.

The ANSV is a public institution, with an autonomous decision making authority and it is settled as an independent body within the Civil Aviation System; therefore the objectivity of its dealings is assured as requested by the EC directive 94/56/CE. To guarantee such independent position ANSV has been put under the surveillance of Presidency of the Council of Ministers. It is the only Civil Aviation institution, which is not under the surveillance of the Ministry of Infrastructures and Transports.

Among all activities carried out by ANSV, the main tasks of the agency are:

1. to carry out technical investigations for Civil Aviation aircraft accidents (*"an occurrence associated with the operation of an aircraft which takes place between the time a person boards the aircraft with the intention of flight until such time as all such persons have disembarked, in which: a person is fatally or seriously injured, the aircraft sustains damage or structural failure, the aircraft is missing or is completely inaccessible"*) and incidents (*"an occurrence, other than an accident, associated with the operation of an aircraft which affects or would affect the safety of operation"*) and to issue safety recommendations. Therefore, ANSV is excluded from the investigation of accidents and incidents that involved State aircraft; those are considered as military aircraft;
2. to conduct studies and surveys aimed at increasing flight safety.

*"ANSV has the sole task of preventing accidents and incidents, with the exclusion of apportioning blame or responsibility. Technical investigations are conducted according to Annex 13 of the Convention for Civil Aviation (OACI, 1944)"*.

The Controlling bodies of ANSV are the President, the Governing Board (consisting of the President who chairs it and by four other members), the Secretary General and the Auditor's Board (consisting of two permanent members and three substitute members). The President is appointed by decree of the President of the Republic, subsequent to Council of Ministers deliberation. The four other members of the governing Board are appointed by the President of the Council of Ministers upon deliberation of the Council of Ministers, and subsequent to nomination by respectively: the Minister of Infrastructure Transport (two members), the Minister of Interior (one member) and the Minister of Justice (one member). The Secretary General is appointed by decree of the President of the Council of Ministers, subsequent to nomination by the Minister of Infrastructure and Transport.

The President and the members of the governing Board appointment is subject to approval by the competent Parliamentary committees, they are appointed for



a five year term of service and they can be confirmed for an additional term of appointment; in taking up their appointment (discharging their duties) they are empowered with accident investigator prerogatives. The Secretary General is appointed for the same duration of the governing Board term of service and he can be confirmed only once for re-appointment.

The Board of auditors members are appointed by decree of the President of the Council of Ministers for a five year term of service. Two permanent members, one of them acting as President, and two substitute members are selected from a list of directors of the Ministry of Economy and Finance (the list is drawn up by the Minister of Economy and Finance); one permanent member and the other substitute member are designated by the Minister of Infrastructure and Transport.

The ANSV has the obligation to investigate all accidents and serious incidents. The notification of accidents and serious incidents to ANSV, judicial authority and national civil aviation body is mandatory for every public authority. But no regulation requires judicial authority and judicial police to advice ANSV. If an accident or incident occur outside the airport area, neither the judicial authority nor the police are obliged to contact ANSV .

ANSV has access to all elements that are useful and can obtain information from public and private subjects and through the examination of knowledgeable witnesses.

Upon conclusion of an accident or an incident investigation, an accident report or an incident report is issued. Accident reports and incident statements are approved by the governing Board of the Agency. Accidents and incidents reports are made public to all applicants. The anonymity of involved subjects is respected.

The ANSV yearly budget has been initially settled up equal to 3,5 M€ that has been increased up to 4.5 M€ in 2003. The financial management of ANSV is under perusal by the State Accounts Court.

The total number of person working at ANSV is equal to 23 (update to year 2003): 7 of them are investigators while 16 works in the administrative and legal area. Since the legislative decree n.66/1999 foresee an agency made of 55 persons, several investigators have been recruited during 2004.

Established	1999
Legal form of the body	Public authority, attached to the Ministry of Transport
Current status	1999; Annex 13 of the Chicago Convention; Directive 94/56/EC; Legislative decree 25-02-1999, n. 66
Relation to the public powers	The President of the Republic appoints the President of the Agency by decree; the President of the Council appoints the four other members of the governing Board. All are appointed for a once renewable 5 year term
Budget (in 2003)	4,55 M€
Personnel (in 2003)	23
Events notified (in 2003)	358
Events investigated (in 2003)	83
Reports published (in 2003)	35

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	yes
Liberty to investigate	nav
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the state of design of the vehicle	yes
Investigation accessible to observers of the state of manufacture	yes
Investigation accessible to observers of the state of occurrence	yes
Investigation accessible to observers of the state of operator	yes
Investigation accessible to observers of the state of registry	yes
Investigation accessible to observers of other substantially interested state	yes
Investigation accessible to observers of other interested organisations	nav
Diverging comments of the observers published	yes
Findings are public	yes
Reports published without further scrutiny	yes
Respect of the anonymity	yes



## 4.2. Maritime Authority

In Italy, a functionally and structurally independent body responsible of maritime accidents technical investigations does not exist. Maritime Authority carries out accident investigations. Maritime Authority is located all over the national coastal strip by means of harbour-offices, maritime district offices and maritime local offices.

According to National Navigation Code art. 578 *“when an accident occurs it has to be notified to the Maritime Authority (or to the Consular Authority if it occurs in international waters) that is then bound to investigate the causes and circumstances that made it happen. Moreover, Maritime Authority must take all precautions to avoid the loss of all the accidents evidences that could be needed for further investigations”*.

As result of all the investigation activities carried out by the Maritime Authority a report is produced that is then sent to the Judiciary Authority that is in charge of conducting the judicial inquiry. The judicial inquiry can also start on request of the person involved in the accident.

The technical commission in charge of supporting the judicial inquiry is nominated by the Ministry of Transport and Navigation by means of a specific decree. The investigation activities carried out by this commission are more detailed and precise if compared with the one performed by Maritime Authority, because the latter aims only at the identification of the causes while the former aims also to establish accident's responsibilities.

### 4.3. RFI – Rete Ferroviaria Italiana SpA

In Italy, before the liberalisation of the rail sector, both rail accidents and incidents were investigated by the FS (Ferrovie dello Stato) the national railway operator and owner of the network. The FS, according to the international definition settled by the International Union of Railways (UIC), were in charge of detecting both typical and atypical accidents. The former refers to accidents involving trains (e.g. collisions, derailments, etc) while the latter refers to atypical accidents due to people's incautious behaviour (e.g. suicide, etc) and to rails damages due to natural factors (e.g. landslide, etc) or to rail circulation attacks.

In year 2000, a holding company (Gruppo Ferrovie dello Stato SpA; [www.ferroviadellostato.it](http://www.ferroviadellostato.it)) completely owned by the State has been created to modernize and optimize the national rail system management. To finalize this process two other companies, 100% owned by Gruppo Ferrovie dello Stato, have been established in year 2001. These are: 1/ RFI (Rete Ferroviaria Italiana SpA; [www.rfi.it](http://www.rfi.it)), which is the infrastructure manager. It operates and maintains the railway network, guarantees the safe circulation of trains on the network and the development of new technologies. 2/ TRENITALIA ([www.trenitalia.it](http://www.trenitalia.it)), which is the main Italian train operator. The holding company only has a "light control" over these companies, which are independent from each other in their juridical and organisational forms, as their juridical identity and their organisational structures are separate.

Since April 2004, the Directive 2004/49/EC of the European Parliament and of the Council provides for the establishment of an independent investigation body in each Member State. According to the Article 21 of this Directive, the future investigation body for Italy's railways shall be "*independent in its organisation, legal structure and decision-making from any infrastructure manager, railway undertaking, charging body, allocation body and notified body, and from any party whose interests could conflict with the tasks entrusted to the investigating body. It shall furthermore be functionally independent from the safety authority and from any regulator of railways*". The body shall investigate all accidents, serious accidents and incidents. The investigation shall in no case be concerned with apportioning blame or liability.

At present, the responsibility for technical investigation of incidents that occur on the Italian rail network comes to RFI. Though RFI conducts accident investigations, it does not have a dedicated unit to perform such investigations. Every time an accident occurs, a specific commission responsible for the investigation is appointed. In case of serious accidents, experts from both RFI and the Ministry of Infrastructure and Transport constitute a special Commission, in cooperation with judicial authorities. Judicial inquiries are compulsory in case of serious accidents.



#### 4.4. ISTAT – National road accident data

In Italy, police authorities (Police, Road Police, Carabinieri, Guardia di Finanza, and Municipality Police within the borders of their municipality) investigate road accidents. According to Article 11 of Road Rules, the law enforcement authorities are in charge of carrying out accident investigation.

Every time an accident occurs, police authorities fill in a police report that contains all the accident data concerning the vehicle, environment, weather conditions, accident description, etc. All the data are then used to fill up the “ISTAT module” that is a standardized form drawn up by the National Institute of Statistic (ISTAT; [www.istat.it](http://www.istat.it)). It contains accident information such as type of road, weather condition, lighting, type of accident and so forth. Once this form has been completed, it is sent to the local office of the respective police authority. It is then sent to the Provincial Capital Statistical Office (for medium-large cities) and then to ISTAT or directly to ISTAT (for small cities). Figure 1 below describes the data transmission chain for large cities. ISTAT is responsible for the data input in the national road accident database.

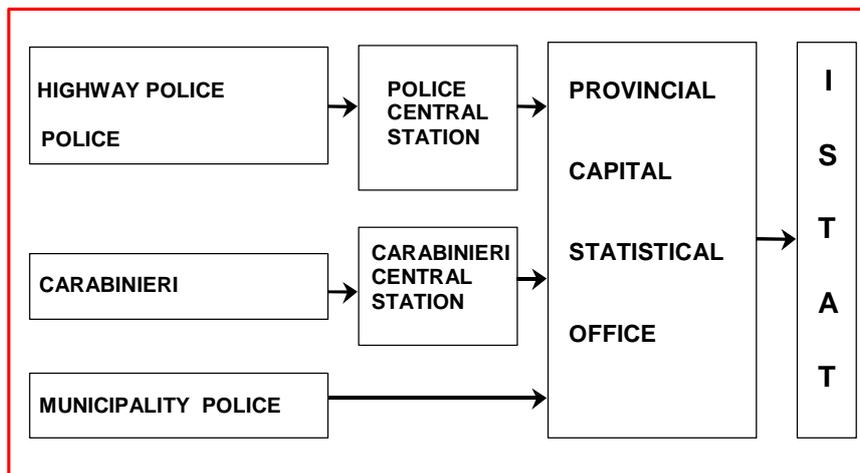


Figure 1 – Data transmission chain from Police Authorities to ISTAT

The main problem of road accident data collected by means of the ISTAT module is that the data variables have been defined in order to perform statistical analysis of road accidents. They allow the making of general analyses but might not be complete enough for more detailed and specific analyses. Another problem related to the actual data collection methodology is due to the transmission process of the accident data from the Police authorities to ISTAT. As briefly described, there are many different authorities in charge of data collection and the transferring process involves at least two intermediate steps.

Such process leads to different types of problems: the loss of information, due both to differences between police reports and the ISTAT module and the loss of information during transmission of the forms to ISTAT offices. For the first, the information concerning for instance the precise accident location disappears, because the ISTAT module provides only general indication on the

location. This particular type of loss causes a major problem since the drawing of precise “black spot maps” becomes impossible. Sometimes the lack of information is also due to incomplete police data; 38% of the Rome Municipality Police reports on road accidents did not provide the precise accident location in 1998. As for the second, the actual process involves too many different authorities and this results to the loss of reports during the data transmission chain from local police stations to central police stations, then to Municipality Statistical Offices and finally to ISTAT.

Another problem about the ISTAT data concerns the differences between the total number of fatalities caused by road accident detected by ISTAT and the one detected by the hospitals. Regarding the period from 1984 to 1994, this difference has been estimated between 25% and 30%.

## 5. Accident investigation in Finland

In Finland, the Accident Investigation Board (<http://www.onnettomuustutkinta.fi/>), established in 1996, investigates all major accidents<sup>24</sup> as well as civil aviation, water traffic and rail traffic accidents and incidents. The Board's mission is to determine the course of events, their causes and consequences as well as the conduct of rescue operations. Although the Board "*operates in connection with the Ministry of Justice /.../ the determination of guilt and liability falls within the competence of other authorities or bodies.*" (Onnettomuustutkintakeskus, no date) The sole purpose of the investigation is to enhance public safety and prevent future accidents.

In accordance with the definition of a major accident given in the Accident Investigation Act, the Board also investigates major road accidents and those road traffic incidents that involve a risk of major accidents. For the investigation of more routine-like road and off-road traffic accidents, there is a separate system.

The Ministry of Transport and Communications has set up The Road Accident Investigation Delegation that supervises the activity of 21 regional Road Accident Investigation Teams. The Traffic Safety Committee of Insurance Companies ([http://www.vakes.fi/lvk/english/index.jsp?cid=lvk\\_en\\_valt&hid=18.07](http://www.vakes.fi/lvk/english/index.jsp?cid=lvk_en_valt&hid=18.07)) organises the actual investigation activities. The focus of an investigation is on the examination of the course of the accident, risk factors, consequences and circumstances in an effort to find out the causes of the accident in order to prevent accidents resulting from such causes in the future.

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<sup>24</sup> The Accident Investigation Act (373/1985) gives the following definition (<http://www.finlex.fi/sv/laki/ajantasa/1985/19850373>).

A *major accident* means an accident that has to be considered as particularly serious because of the number of killed or injured victims, or because of the damage caused to the environment or property.

## 5.1. Accident Investigation Board

The Accident Investigation Board (<http://www.onnettomuustutkinta.fi/>) is a permanent, independent accident investigating body. It was established in 1996, on the basis of the Accident Investigation Act (373/1985). “*The Accident Investigation Board is an impartial and independent body that operates in connection with the Ministry of Justice.*” (Onnettomuustutkintakeskus, no date)

The Council of State (Finnish government) appoints the director of the Accident Investigation Board. The director must have a higher university degree, a good knowledge of the tasks involved with the post and experience on management. The director appoints the personnel of the Board. The Accident Investigation Board “*operates in connection with the Ministry of Justice*” but “*the determination of guilt and liability falls within the competence of other authorities or bodies.*” (Onnettomuustutkintakeskus, no date) The Board is separate from the regulating authorities in aviation<sup>25</sup>, maritime<sup>26</sup>, rail<sup>27</sup> and road<sup>28</sup> transports. The Board can demand, when it is necessary for the safety investigation, the assistance of other authorities and public establishments, whether it be in drafting reports, carrying out expertises or other type of assistance.

The Board has an obligation to investigate all civil aviation accidents and serious incidents as defined by the Council Directive 94/56/EC. In maritime transport, the Board shall investigate all accidents that occur on Finnish national waters or that involve a Finnish vessel. In the field of rail transport, the Directive on safety on the Community’s railways defines the accidents, which the Board shall investigate. The Board shall also investigate those rail traffic operations

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<sup>25</sup> The national regulating authority for civil aviation is the Flight Safety Authority (FSA), tasked with maintaining and enhancing flight safety in Finland (<http://www.flightsafetyauthority.fi/aviators>). It operates under the Finnish Civil Aviation Administration (CAA), but has independent powers of decision. CAA (<http://www.ilmailulaitos.fi/caafinland>) is a commercial enterprise responsible for Finland’s network of airports and the air navigation system and provides “*safe, competitive airport and air navigation services as well as their supporting commercial operations*” (Civil Aviation Administration, 2004). CAA is also co-responsible (with the Ministry of Transport and Communications and the Ministry of Foreign Affairs) for air transport policy.

<sup>26</sup> In maritime transport the regulating authority is the Finnish Maritime Administration (<http://www.fma.fi/e/>). It is “*responsible for maritime safety, fairway maintenance, hydrographic charting, winter traffic assistance and the provision of ferry services to the archipelago communities. The Administration is also responsible for the vessel traffic service (VTS) and is the authority supervising pilotage.*” (Finnish Maritime Administration, no date)

<sup>27</sup> The national authority for rail is the Finnish Rail Administration (<http://www.rhk.fi/english/index.html>), “*in charge of maintaining and developing the rail network, is responsible for the safety of rail traffic, and provides a competitive transport network for use by railway companies.*” (Finnish Rail Administration, 2004)

<sup>28</sup> The Finnish Vehicle Administration AKE ([http://www.ake.fi/index\\_e.asp](http://www.ake.fi/index_e.asp)) “*is an administration, service and information centre operating under the aegis of the Ministry of Transport and Communications. AKE is responsible for promoting vehicle safety, environmental awareness and vehicle traffic information services. Its responsibilities include vehicle and driving licence registration, annual vehicle taxation, arranging driving tests, the supervision of motor vehicle inspection and handling the type approval.*” (The Finnish Vehicle Administration AKE, no date)

accidents, that have caused the death or serious injury of at least one person or that involve the transport of dangerous goods. For tracked transport, the Board has the obligation to investigate accidents that have caused the death or serious injury of several persons or accidents that, for other reasons, should be investigated in order to enhance the transport safety. The Board has the obligation to investigate all major accidents regardless of the domain<sup>29</sup> and it can investigate incidents where the danger of a major or transport accident was obvious.

An accident investigation aims to determine the course of events, their causes and consequences as well as the conduct of rescue operations. The investigation determines whether the design, construction or fabrication and use of machines or structures that caused or that were subjected to the accident or incident took safety requirements sufficiently into account and whether the control and surveillance activities were adequately organised and executed. The investigation shall also evaluate safety regulations for possible defects. The purpose of an investigation is to enhance the general safety and prevent similar accidents from recurring.

In case of a major accident, the Board proposes to the Ministry the setting up of, and any subsequent modifications to, an *ad hoc* commission. In case of a serious accident or an incident where the danger of a major accident is obvious, the Board sets up a commission for the investigation. In case of a routine accident or incident, one or several safety investigators, appointed by the Board, investigate the accident. In case of recurring accidents or incidents that the Board would not investigate if they were isolated events, the Board may investigate these accidents or incidents as a whole<sup>30</sup>. The commission or, if a commission has not been set up, the Board decides the scope and the methods of investigation. The Board is subject to the same legal framework as the commission.

The Board has permanent staff of 10, out of which 7 investigators, in Helsinki. The safety investigators have access to the accident or incident site. They can take any necessary actions to preserve and safeguard evidence. When the authority or establishment that receives distress calls or when any other authority learns of an event that may be investigated under the Accident Investigation Act, it will immediately notify the Accident Investigation Board. The Board decides of the opening of an investigation. If a commission is set up for

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<sup>29</sup> A *major accident* means an accident that has to be considered as particularly serious because of the number of killed or injured victims, or because of the damage caused to the environment or property. (Finland, 1985: 3§)

<sup>30</sup> The Board identifies all its reports in a way that reveals the seriousness of the event, the year and the rank it took place as well as its domain.

The seriousness varies from A for a major accident, to B for a serious accident or an incident where the danger of a major accident is obvious, to C for a routine accident or incident, to D for recurring accidents or incidents. "L" stands for aviation, "M" stands for maritime, "R" for rail and "Y" for other accident.

the investigation, the responsibility over it is transferred to the commission as soon as it is operational.

The safety investigators have access to any material or document relevant to the investigation, including the evidence of a judicial inquiry. The safety investigation can be conducted in cooperation with the judicial inquiry to the extent judged necessary by the commission. The safety investigators can remove material, test it and take samples as necessary for the investigation. The investigation report shall contain recommendations on actions that would enhance the transport safety, prevent future accidents, prevent and minimise damage and improve rescue operations. The anonymity of those involved in the accident is respected. The aviation reports contain the following warning: *“According to Annex 13 of the Convention on International Civil Aviation, paragraph 3.1, the purpose of aircraft accident and incident investigation is the prevention of accidents. It is not the purpose of aircraft accident investigation or the investigation report to apportion blame or to assign responsibility. This basic rule is also contained in the Investigation of Accidents Act, 3 May 1985 (373/85) and European Union Directive 94/56/EC. Use of the report for reasons other than the improvement of safety should be avoided.”* The maritime, rail and major accident reports contain the following warning: *“This investigation report has for purpose the enhancement of safety and the prevention of future accidents. It does not deal with liabilities or damages. The use of the investigation report for other than safety enhancement purposes should be avoided.”*

The investigation report on a major accident is addressed to the Council of State. The investigation report on accidents and incidents is addressed to the Ministry of Justice. At the Board’s request and within a period of time set by it, the addressees, public authorities or establishments, have the obligation to inform the Board on the actions they have taken as a result of the safety recommendations. The investigation report is published.

The delay between the accident and the publication of the final report is around one year, except for the maritime where the Board seems to have a serious backlog of work. In 2003, it started 11 B or C maritime investigations and published 28 B or C maritime investigations, which had been started between 1995 and 2003. Between 1999 and 2003, the Board started 94 B or C aviation accident investigations (no A or D investigations), 57 B or C maritime accident investigations (no A or D investigations), 61 B or C rail accident investigations (no A or D investigations) and 16 other accident investigations. Two of these other investigations were of A level (a coach accident and a fire in a public building), 11 B or C accidents (one concerned a coach fire) and three D level accidents (two were on coach fires).

Established	1996
Legal form of the body	Public authority; operates in connection with the Ministry of Justice
Current status	1996; Annex 13 of the Chicago Convention; Directive 94/56/EC; IMO Code 27/11/1997; Directive 2004/49/EC; Accident Investigation Act (373/1985)
Relation to the public powers	Council of State appoints the Director of the Board
Budget	nav
Personnel	10 out of which 7 investigators (in 2003 the Board appointed 88 investigators to work in commissions)
Events notified	nav
Events investigated (in 2003)	40 (12 in aviation; 11 in maritime; 11 in rail; 5 incidents involving the danger of a major accident and one study on several fatal fires in dwellings)
Reports published (in 2003)	58 (17 in aviation; 28 in maritime; 12 in rail and 1 major accident)

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from to the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Investigation aimed at establishing the (probable) cause(s) of an accident	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	yes
Liberty to investigate	yes
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the State of design of the vehicle	yes
Investigation accessible to observers of the State of manufacture	yes
Investigation accessible to observers of the State of occurrence	yes
Investigation accessible to observers of the State of operator	yes
Investigation accessible to observers of the State of registry	yes
Investigation accessible to observers of other substantially interested States	yes
Investigation accessible to observers of other interested organisations	no
Diverging comments of the observers published	yes
Findings are public	yes
Reports published without further scrutiny	yes
Respect of the anonymity	yes



## 5.2. Road Accident Investigation Delegation & Road Accident Investigation Teams

According to the Act on the Investigation of Road and Cross-country Traffic Accidents, enacted on January 19<sup>th</sup> 2001, regional Road Accident Investigation Teams routinely investigate all fatal road and cross-country accidents. The Road Accident Delegation, set up by the Ministry of Transport and Communications, steers the activity of the 21 regional teams. This system, set up by the law of 2001, is quite similar to the system for investigating road accidents that existed in Finland since 1967, when the Finnish Motor Insurers' Centre (FMIC; <http://www.vakes.fi/lvk/english/index.jsp>) set up the Traffic Safety Committee of Insurance Companies (VALT) for the promotion of road safety. As a statutory organisation, FMIC participates in road safety work, as provided by the Motor Liability Insurance Act (Finland, 1959).

The Road Accident Investigation Delegation is a cooperation body that consists of representatives of the statutory participating bodies: Ministries of Transport and Communications, Interior, Social Affairs and Health, Justice and of Education, The Finnish Road Administration, The Finnish Vehicle Administration and The Finnish Motor Insurers' Centre. Other bodies may also be represented; currently RAID includes representatives from Turku university, the highway police, the Accident Investigation Board etc. These other bodies "*shall be given by Council of State Decree*" (Finland, 2001: 4§). The Ministry of Transport and Communications appoints the members of the delegation, on the proposal of the participating bodies, for a term of three years. The delegation supervises the investigation work and appoints the investigation teams for a term of five years. The delegation and the investigation teams operate in connection with the FMIC. VALT organises the actual investigation activities. The investigation teams investigate all fatal accidents (around 370 per year) as well as other accidents as defined by VALT for specific safety research purposes. In all, the investigation teams study around 500 accidents per year.

Among other recipients in the field of road safety, FMIC receives each year around 1 M€ from the Ministry of Social Affairs and Health for financing investigation work and other safety related initiatives. The Ministry Of Social Affairs and Health is responsible for distributing money collected by road safety charges loaded into motor liability insurance premiums.

An accident investigation is conducted for safety purposes. The investigation teams are independent bodies while carrying out their work. The investigators collect information on the involved persons and vehicles, the road and weather conditions, the circumstances and consequences of the accident. The collected information serves to prepare an accident report and to formulate subsequent safety recommendations. If the Accident Investigation Board decides to open an investigation on a major road or cross-country accident, the road accident investigation teams shall not initiate an investigation on that accident and shall discontinue any investigation already initiated. The Accident Investigation Board's findings are available as would be the findings of an investigation by the Road Accident Investigation Team.



The Road Accident Investigation Teams use the VALT-method in their investigations. *“The present system consists of a standardised, multidisciplinary, in-depth investigation programme which is carried out at the earliest possible on the scene of the accident and which focuses on examining pre-crash circumstances. Information is recorded on standardised forms about all parties and vehicles involved in the accident and about road conditions, without taking a stand on guilt.”* (Hantula, 2001) The teams consist of a police member, a vehicle engineer, a road specialist, a physician and a psychologist. The local police forces alert the police member of the team, who then alerts the other members. The team is operational on the accident site 1 to 2 hours after the accident.

On the scene, the accident investigators first work individually and then construct an overall picture of the events. The accident investigators interview as soon as possible witnesses and persons involved in the accident. The team may ask the police to isolate the accident scene. The team has access to police and autopsy records and to any material or document relevant to the investigation. The accident investigators can remove material, test it and take samples as necessary for the investigation. The investigation is conducted in cooperation with the judicial inquiry to the extent judged necessary by the investigation team.

The investigation report contains the findings –the course of events, the contributing factors, accident consequences as well as vehicle and injury data– and the subsequent safety recommendations. The reports contain following warning: *“RESTRICTION OF THE USE OF THE INVESTIGATION REPORT: This accident has been investigated and the investigation report has been written in accordance with Act No. 24/2001 for the improvement of road safety. The investigation does not address liability for the accident or liability for damages. Use of this investigation report for purposes other than improvement of road safety must be avoided and no information contained herein may be linked to personal data.”*

The report is addressed to VALT. The teams and the delegation may also submit proposals on safety enhancement actions to the competent authorities. FMIC maintains an accident database, containing over 400 variables per accident, for the purpose of road safety research and other safety-oriented activities.

In addition to the investigation reports, VALT publishes annual reports and the database information is available to authorities and researchers free of charge. The road accident data is also widely used for dissertations. The use of road accident data is submitted to the respect of the privacy of the involved persons.

Established	1967	
Legal form of the body	Public authority	
Current status	2001; Act on the investigation of road and cross-country traffic accidents, January 19 <sup>th</sup> 2001	
Relation to the public powers	Minister Transport and Communications sets up RAID and approves the RAID action plan	
Budget	1M€	
Personnel	8 (VALT) + 250 (RAIT)	
Events notified	<i>nav</i>	
Events investigated	500 ( <i>average per year</i> )	
Reports published	500 ( <i>average per year</i> )	
<i>Structural independence:</i>		
Separate from the market authority		yes
Separate from the operations authority		yes
Separate from to the safety authority		yes
Permanence of the investigating body		yes
Safety investigation's legal status		yes
Safety investigator's legal status		yes
Investigation aimed at establishing the (probable) cause(s) of an accident		yes
Liability issues excluded		yes
Findings cannot be used for the purposes of the judicial enquiry		yes
<i>Financial independence:</i>		
Financial autonomy of the investigating body		yes
Financial autonomy to carry out investigations		yes
Absence of relations to the industry (constructors, operators or others)		yes
<i>Functional independence:</i>		
Obligation to investigate		yes
Liberty to investigate		yes
Autonomous determination of the scope of the investigation		yes
Autonomous determination of the methods of investigation		yes
Access to the evidence		yes
Access to the witnesses		yes
Investigation accessible to observers of the State of design		no
Investigation accessible to observers of the State of manufacture		no
Investigation accessible to observers of the State of occurrence		no
Investigation accessible to observers of the State of operator		no
Investigation accessible to observers of the State of registry		no
Investigation accessible to observers of other substantially interested State		no
Investigation accessible to observers of other interested organisations		no
Diverging comments of the observers published		<i>nap</i>
Findings are public		yes
Reports published without further scrutiny		yes
Respect of the anonymity		yes

## 6. Accident investigation in United Kingdom

The United Kingdom has two independent, dedicated accident investigation bodies. These are the Air Accident Investigation Branch (AAIB), responsible for civil aviation accident investigation and the Maritime Accident Investigation Branch (MAIB), responsible for maritime accident investigation.

In rail, a new investigation branch is being set up, partly in order to comply with a European directive aimed at creating greater harmonisation for accident investigation procedures across Europe. This will be known as the Rail Accident Investigation Branch (RAIB), and it will follow closely the structure of the AAIB and the MAIB. In some instances, there might be an overlap with the work of the Health and Safety Executive. An incident such as the Kings Cross fire of 1987 would remain the responsibility of the HSE. Currently, Investigators are responsible to the HSE. At present, most incidents are initially dealt with by the British Transport Police ([www.btp.police.uk](http://www.btp.police.uk)) More serious incidents are then investigated by Her Majesty's Railway Inspectorate ([www.hse.gov.uk/railways/investigation.htm](http://www.hse.gov.uk/railways/investigation.htm)).

There is currently no independent accident investigation body in place to examine road traffic accidents in the UK, as there is for the other modes of transport. The police and other emergency services deal with accidents on the UK roads but they are not a dedicated independent body. A small proportion of UK road traffic accidents are examined by independent research teams as part of funded research projects, but again, this facility is not a dedicated independent and routinely occurring function. These practices are detailed later in this section.

## 6.1. AAIB – Air Accidents Investigation Branch

Legal framework for investigating air accidents is set out under the Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996 and accident investigation is undertaken by the Air Accident Investigation Branch (AAIB). The AAIB is an independent part of the Department for Transport (DfT). It is not part of the Civil Aviation Authority. The AAIB is independent of the Safety Regulation Group (SRG; <http://www.caa.co.uk/default.aspx?categoryid=3>), responsible for regulating the industry, checking that aircraft meet set standards, licensing operators, and analysis of accident and incident data.

The AAIB is responsible for the investigation of civil aircraft accidents and serious incidents within the UK. It also assists in UK military accidents and investigations abroad. Its headquarters is at Farnborough in Hampshire. Authority for the AAIB to investigate accidents originates from the Civil Aviation Act; Civil Aviation (Investigation of Air Accidents) Regulations. The Chief Inspector of the AAIB is appointed by, and reports directly to the Secretary of State. The AAIB has a staff of 52, but also brings in expertise when required. Such outside assistance is paid for by the AAIB.

The purpose of any investigation is to determine the circumstances and causes of the accident and to make safety recommendations, if necessary, with a view to the preservation of life and the avoidance of accidents in the future. It is not to apportion blame or liability. The AAIB is not a regulatory authority and therefore cannot enforce its recommendations.

When an accident or a serious incident occurs, the AAIB Duty Co-ordinator is notified. This post holder liaises with the Police, Emergency Services, Air Traffic Control and the Aircraft Operator to ensure that evidence associated with the accident is impounded and secured. Access to the accident site is strictly controlled by the police. The Operations Inspector, an experienced professional pilot, will examine flying procedures and techniques; human factors; aircraft performance; survivability; weather; airfields; air traffic control and witness information etc. The Engineering Inspector, an experienced aeronautical engineer, will examine the aircraft airworthiness; systems; engines; structure; failure and fault analysis; maintenance procedures, records and documentation etc. In the case of a public transport accident, the Flight Recorder Inspector, also an experienced aeronautical engineer, will examine data recorded on the Flight Data Recorder (FDR), Cockpit Voice Recorder (CVR) and other recorded information.

Regulation 9 provides inspectors with a right of access to an accident site & empowers them to remove evidence. Inspectors have powers to take signed statements from anyone involved directly or indirectly with the accident. They can remove and retain all relevant books, papers, documents or articles and can have access to and inspect any place, building or aircraft for the purposes of completing their enquiries.

When the Inspectors return to AAIB HQ they present their initial findings to the Chief Inspector of Air Accidents. The Chief Inspector then decides how the



investigation will proceed and the form of report appropriate to the type and seriousness of the accident or incident.

Investigations into major disasters may involve the Group System of Investigation. In this case an Investigator-in-Charge (IIC) will coordinate the investigation, and investigation groups, each headed by an AAIB Inspector, will be formed to investigate specific aspects of the accident. Participating in these groups may be representatives of the Operator, Manufacturer, Regulator, Unions and other specialists. Accredited Representatives from the State of Manufacture, State of Registration and any other State with Special Interest, together with their advisors may also participate.

A report on the investigation can take several months to produce. It may be necessary to interview a wide range of individuals, cross-check evidence, examine suspect equipment and consult technical experts. Often the actual cause of an accident turns out to be very different from the convenient solution identified by the media in the immediate aftermath. The report will protect the anonymity of the persons involved and, if appropriate, contain safety recommendations. A draft copy of the report will be sent to the pilots, or their representatives, and to those persons or organisations whose reputations may be adversely affected. They will be allowed 28 days to make representations before the report is finalised. A copy of the final report will be sent to those persons and organisations before it is published. Reports will also be made available on the AAIB internet web site on the day of publication.

Her Majesty's Coroner or Procurator Fiscal (if the accident occurred in Scotland) normally hold an inquest or fatal accident inquiry for deaths occurring in unusual circumstances. These court proceedings can often occur many months after the accident and often attract renewed media interest. The AAIB Inspectors prepare statements for the courts and are normally required to appear at the Inquest or Inquiry as expert witnesses. A date for the inquest or Fatal Accident Inquiry will be decided upon by the courts once those statements and other evidence have been received. The Coroner's Officer, who can be contacted through the local police station, or Procurator Fiscal's office should be contacted on all matters relating to the Inquest or Fatal Accident Inquiry and for the return of personal effects.

All of these details are laid out in detail in a Statutory Instrument (regulations), The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.

Further information on the AAIB is available from <http://www.aaib.dft.gov.uk/home/index.cfm>



Established	1915	
Legal form of the body	public authority, state body (Department for Transport)	
Current status	Annex 13 of the Chicago Convention; Directive 94/56/EC; Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996	
Relation to the public powers	The Secretary of State for Transport appoints the Chief Inspector	
Budget	<i>nav</i>	
Personnel	52	
Events notified	<i>nav</i>	
Events investigated	<i>nav</i>	
Reports published	<i>nav</i>	
 <i>Structural independence:</i>		
Separate from the market authority		yes
Separate from the operations authority		yes
Separate from to the safety authority		yes
Permanence of the investigating body		yes
Safety investigation's legal status		yes
Safety investigator's legal status		yes
Liability issues excluded		yes
Findings cannot be used for the purposes of the judicial enquiry		yes
 <i>Financial independence:</i>		
Financial autonomy of the investigating body		yes
Financial autonomy to carry out investigations		yes
Absence of relations to the industry (constructors, operators or others)		yes
 <i>Functional independence:</i>		
Obligation to investigate		yes
Liberty to investigate		yes
Autonomous determination of the scope of the investigation		yes
Autonomous determination of the methods of investigation		yes
Access to the evidence		yes
Access to the witnesses		yes
Investigation accessible to observers of the State of design		yes
Investigation accessible to observers of the State of manufacture		yes
Investigation accessible to observers of the State of occurrence		yes
Investigation accessible to observers of the State of operator		<i>nap</i>
Investigation accessible to observers of the State of registry		yes
Investigation accessible to observers of other substantially interested State		yes
Investigation accessible to observers of other interested organisations		yes
Diverging comments of the observers published		yes
Findings are public		yes
Reports published without further scrutiny		yes
Respect of the anonymity		yes

## 6.2. MAIB – Maritime Accidents Investigation Branch

The Marine Accident Investigation Branch (MAIB) examines and investigates all types of marine accidents to or on board UK ships worldwide, and other ships in UK territorial waters.

As far as the MAIB is concerned, the fundamental purpose of investigating an accident is to determine its circumstances and causes, with the aim of improving the safety of life at sea and the avoidance of accidents in the future. It is not the purpose to apportion liability, nor, except so far as is necessary to achieve the fundamental purpose, to apportion blame. The MAIB does not enforce laws or carry out prosecutions.

Located in offices in Southampton, the MAIB is a separate branch within the Department for Transport (DfT). It is not part of the Maritime and Coastguard Agency (MCA; <http://www.mcga.gov.uk>), whose role is to ensure that safety standards are set and achieved. The head of the MAIB, the Chief Inspector of Marine Accidents is appointed by, and reports directly to the Secretary of State for Transport. The MAIB funds all of its own investigations from an allocated budget, but may seek additional resources in response to a specific event. MAIB has a staff of 35. There are four teams of accident investigators, each consisting of a principal inspector and three inspectors. All are professionally qualified and experienced in the nautical, engineering, naval architecture and/or fishing disciplines of the marine industry.

The powers of MAIB inspectors, and the framework for reporting and investigating accidents, are set out in the Merchant Shipping Act 1995. The Merchant Shipping (Accident Reporting and Investigation) Regulations 1999 put the framework into effect. These regulations are the foundation of the MAIB's work. They apply to merchant ships, fishing vessels and (with some exceptions) pleasure craft. They define accidents, set out the purpose of investigations and lay down the requirements for reporting accidents. They make provision for the ordering, notification and conduct of investigations, but allow inspectors a good deal of discretion – necessary, given the wide variety of cases. There is a Memorandum of Understanding between the Health and Safety Executive (HSE; [www.hse.gov.uk](http://www.hse.gov.uk)), the MAIB and the MCA as to which organisation will take the lead in investigations where they share a common interest, particularly at the ship/shore interface.

MAIB definitions are compatible with, but not identical to the standard IMO definitions. An *accident* is an undesired event that results in personal injury, damage or loss. Accidents include loss of life or major injury to any person on board, or when a person is lost from a ship; the actual or presumed loss of a ship, her abandonment or material damage to her; collision or grounding, disablement, and also material damage caused by a ship. An accident can also be an occurrence such as the collapse of lifting gear, an unintended movement of cargo or ballast sufficient to cause a list, a loss of cargo overboard or a snagging of fishing gear which results in the vessel heeling to a dangerous angle, if the occurrence could have caused serious injury or damage to the



health of any person. It is the duty of every master or skipper to examine any accident occurring to, or on board, his/her ship.

A *major injury* includes any fracture to, or loss of, a limb, loss of sight, or any other injury requiring resuscitation or leading to hypothermia or confinement to bed for more than 24 hours. A *serious injury* is an injury, other than a major injury, when the injured person is incapacitated for more than three consecutive days.

A *hazardous incident* is when an accident nearly occurs in connection with the operation of a ship. In other words, it is what is often known as a "near miss".

Accidents, including major injuries, must be reported to the MAIB within 24 hours by the quickest possible means. This is so they can be investigated immediately, before vital evidence decays, is removed or is lost. Serious injuries must be reported within 14 days. Hazardous incidents don't have to be reported, but the MAIB encourages masters and skippers to report them. Hazardous incidents often teach us lessons that are every bit as relevant as those arising from accidents.

The MAIB has a special accident reporting line and this line is connected directly to the MAIB offices in Southampton during working hours, and switches automatically to the Department for Transport's (DfT; [www.dft.gov.uk](http://www.dft.gov.uk)) duty officer at all other times.

During working hours, reports are collated by the MAIB's support staff and referred to an inspector for a decision on what action to take. In some cases the initial report contains all the information that is needed. In others, the inspector will make further enquiries, make a preliminary examination, or start an investigation. Outside working hours, the DfT duty officer passes any reports to the MAIB duty coordinator, who decides what action to take.

Following notification of an accident, inspectors will start to collect evidence and the decision whether or not to conduct a preliminary examination (PE) will be made. A PE identifies the causes and circumstances of an accident to see if they meet the criteria required to warrant an MAIB investigation and its publicly available report. If it is decided as a result of the PE that the criteria have not been met, the MAIB will not conduct an investigation and all involved parties will be notified. Every effort is made to examine a wide range of accidents each year. All PEs and accident investigations seek answers to four basic questions: what happened; how did it happen; why did it happen; what can be done to prevent it happening again. Once the decision to proceed has been made, all available evidence is gathered. No two cases are ever the same, and the process may take different forms. Inspectors will usually wish to see logbooks, charts and other documents. They will invariably interview those who may be able to shed light on what happened and are likely to take photographs and examine computer records. If the vessel contains a 'black box', the data will be removed and examined.

Section 259, MSA 1995 gives inspectors the power of entry and the power to remove evidence. Inspectors consider evidence from as many sources as



possible. If necessary, they will call in technical experts from outside the Branch. The MAIB places particular emphasis on identifying human factors in the causes of an accident.

In very general terms, it can take nine months to a year to complete an investigation and write a report. At first sight this might seem a long time, but it may be necessary to interview a wide range of individuals, cross-check evidence, examine suspect equipment and consult with technical experts. Often the true cause of an accident turns out to be very different from the convenient solution identified by people who are not accident investigators. An investigation or PE is entirely independent of any enquiries made by the police or other authority collecting evidence for a possible prosecution.

The MAIB aims to improve safety for all those who work at, or travel by, sea. The MAIB's investigation findings almost always lead to recommendations aimed at preventing similar accidents. If a decision has been made to investigate an accident, the MAIB will make the results publicly available in a full report. The accident investigation report is not written with liability in mind and is not intended to be used in court for the purpose of litigation. It endeavours to identify and analyse the relevant safety issues pertaining to the specific accident, and to make recommendations aimed at preventing similar accidents in the future.

Three times each year, the MAIB produces a Safety Digest – a collection of short, anonymous reports on the lessons learned from examinations and investigations. From time to time, the Chief Inspector may publish a report highlighting specific safety problems, safety trends, or any other issues he feels should be brought to the attention of the maritime community and the public. The MAIB produces an annual report which describes what the Branch has done over the past year. All these publications are available free of charge from the MAIB and are also on the MAIB website. The MAIB maintains a computerised database of reportable marine accidents which have occurred since 1991. Besides providing an accessible source of information, the database can be analysed to identify accident trends. Accident statistics are set out in the MAIB's annual report.

All of these details are laid out in detail in a Statutory Instrument (regulations), The Merchant Shipping (Accident Reporting and Investigation) Regulations 1999.

Further information on the MAIB is available from <http://www.maib.gov.uk/home/index.cfm>

Established	1989	
Legal form of the body	public authority, state body (Department for Transport)	
Current status	IMO Code 27/11/1997; Directive 1999/35/EC; Merchant Shipping (Accident Reporting and Investigation) Regulations 1999	
Relation to the public powers	The Secretary of State for Transport appoints the Chief Inspector	
Budget	€2.89 million (in 2002/3)	
Personnel	35 staff including 19 investigators	
Events notified (in 2003)	1522	
Events investigated (in 2003)	22 preliminary and 15 full MAIB investigations	
Reports published (in 2003)	29	
 <i>Structural independence:</i>		
Separate from the market authority		yes
Separate from the operations authority		yes
Separate from to the safety authority		yes
Permanence of the investigating body		yes
Safety investigation's legal status		yes
Safety investigator's legal status		yes
Liability issues excluded		yes
Findings cannot be used for the purposes of the judicial enquiry		yes
 <i>Financial independence:</i>		
Financial autonomy of the investigating body		yes
Financial autonomy to carry out investigations		yes
Absence of relations to the industry (constructors, operators or others)		yes
 <i>Functional independence:</i>		
Obligation to investigate		yes
Liberty to investigate		yes
Autonomous determination of the scope of the investigation		yes
Autonomous determination of the methods of investigation		yes
Access to the evidence		yes
Access to the witnesses		yes
Investigation accessible to observers of the State of design		yes
Investigation accessible to observers of the State of manufacture		yes
Investigation accessible to observers of the State of occurrence		yes
Investigation accessible to observers of the State of operator		nav
Investigation accessible to observers of the State of registry		yes
Investigation accessible to observers of other substantially interested State		yes
Investigation accessible to observers of other interested organisations		yes
Diverging comments of the observers published		yes
Findings are public		yes
Reports published without further scrutiny		yes
Respect of the anonymity		yes

### 6.3. HMRI – Her Majesty’s Railway Inspectorate & RAIB – Rail Accident Investigation Branch

The law requires the railways industry to report certain incidents of injury and ill-health and other incidents to Health and Safety Executive (HSE), [www.hse.gov.uk](http://www.hse.gov.uk), which is the safety regulator in Great Britain. About 30 incidents a day (approximately 10,000 annually) are notified to the HSE under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995. Most of these are written reports of minor occurrences. Railtrack’s national control centre also notifies many incidents and near misses on a voluntary basis to Her Majesty’s Railway Inspectorate (HMRI, which is an inspectorate within the HSE) accident office at HSE’s headquarters where they are analysed and cascaded to HMRI’s field inspectors for follow up action.

Under existing legislation, rail accidents and incidents are investigated by HMRI. It looks at the individual reports to decide whether inspectors should also investigate the incident. Decisions on which incidents require investigation are taken in most cases by the relevant field teams and take account of the nature of the incident and the extent to which there might be wider implications and lessons. HMRI cannot investigate all the reported incidents but investigates the most serious ones including any major incidents such as train crashes. Section 20 (2) of the Health and Safety at Work Act (HSWA) 1974 provides inspectors with the power of entry to a site, and the power to remove evidence. The two main objectives of HMRI’s investigation are to find out the root (or underlying) causes of a serious incident to help prevent similar incidents in future and to find out whether there has been any serious breach of health and safety legislation. Focus of investigation is crash causation, not injury analysis.

When investigating major incidents such as train crashes, HSE has a policy of publishing interim reports as soon as possible. This is so that early findings and lessons to be learnt can be made openly available as early possible to the industry and the public. Summaries of HSE investigations into other rail incidents which attract significant public interest are also made publicly available.

Industry investigations are carried out under the Railway Group Standard, which sets out the requirements for the investigation of railway accidents and incidents. It defines an *accident* as “*an unplanned, uncontrolled and unintended event, giving rise to death, ill health, injury or other loss*” and an *incident* as “*an unplanned and uncontrolled event which under different circumstances may have resulted in an accident*”.

The Rail Accident Investigation Branch (RAIB) was established in 2003 by the Railways and Transport Safety Act (RTSA) to undertake independent investigation of serious accidents and other incidents on the railways. It will act as the “lead” investigation body and will have a coordinating role in any investigations it undertakes. Regulations developed under the RTSA will set out the framework for RAIB but HSE will need to continue to investigate serious incidents to find out whether there has been a breach of health and safety law



and take appropriate enforcement action to ensure the continued safety of the railways. RAIB published a consultation document on the draft Railways (Accident Reporting and Investigation) Regulations in September 2004 and work continues to develop RAIB and HSE working procedures when RAIB starts investigating railway accidents in March 2005. The purpose of these investigations will be to explore the root cause without apportioning blame or liability.

On 18 July 2002 the Government issued a consultation document entitled 'Establishing a Rail Accident Investigation Branch (RAIB)' containing detailed proposals on the creation of an independent rail accident investigation body. Lord Cullen recommended the establishment of the RAIB in the second part of his report into the Ladbroke Grove train crash. The Government's proposals in the consultation document proposed that the structure and governance of RAIB follow the models of the Air Accidents Investigation Branch (AAIB) and the Marine Accident Investigation Branch (MAIB). The AAIB and MAIB are formally part of the Department for Transport but they operate as fully independent bodies.

The Government proposes that the fundamental purpose of the RAIB should be to undertake inquiries, which look for the root causes of accidents without apportioning blame or liability. The RAIB's powers should be restricted to railway activities. The Government proposes to give the RAIB the power to undertake an investigation, which occurs on any railway (network, track or rolling stock), a tramway, or a transport system which uses another mode of guided transport but which is not a trolley vehicle system. The Government proposes that the RAIB should investigate the categories of occurrences set out in the draft European rail safety directive with the additional ability to undertake inquiries into near misses and precursors (a number of similar single events) connected with train movement activities that might hold important safety lessons for the industry. The RAIB investigation should not be delayed or constrained by any criminal investigation or judicial process. There is an overriding interest in finding the cause of an accident as quickly as possible, and promulgating safety critical information to the industry without delay. The procedures to be used in the course of an investigation are described in the introductory, including the need to preserve evidence, the protection of witnesses from self incrimination and the openness of investigations.

The interfaces between the various organisations involved in different aspects of rail accident investigation are complex. There is an obvious need for protocols to ensure co-operative working between the RAIB, HSE, British Transport Police (BTP) and Crown Prosecution Service (CPS).

The Government considered that the provision of funding to the RAIB should be made through grant in aid. It was also proposed that the rail industry contribute to the running of RAIB by providing some technical assistance free of charge or for a nominal charge to an investigation.

The general purpose of RAIB is thus clear: to undertake investigations and inquiries, the sole objective of which is to discover what caused an incident or



accident, so that lessons may be learned and safety improved throughout the industry. It is likely that this would be set out in much the same way that Regulation 4 of The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996, sets out the clear objective of AAIB investigations.

After considering what is investigated now within the rail, aviation and maritime sectors, the Government proposes that RAIB should follow the European proposal, with the additional ability to undertake inquiries into incidents, near misses and precursors (a number of similar single events) connected with train movement activities that might hold important safety lessons for the industry. In other words RAIB's remit should be limited to train movements or matters which might affect train movements (for example, a fire on a train). This would include vandalism which endangered train movement. The RAIB should not investigate incidents involving people on railway premises where the incident was not connected with the movement of railway vehicles. Therefore, an incident such as the tragic fire on the underground escalator at Kings Cross would continue to be for the fire authority, HSE and/or BTP to investigate. The health and safety of staff from matters not connected with train movement, including acts of violence by passengers, would also be for the HSE and/or BTP to investigate. Additionally, in the case of the MAIB and the AAIB the Chief Inspector is able to direct the MAIB or AAIB respectively to undertake, reopen, or expand an investigation if new evidence comes to light. The Secretary of State for Transport also has a reserve power to direct the MAIB to undertake or expand an investigation. The Government sees value in the Chief Inspector of Rail Accidents having the power to decide that RAIB should undertake, expand or reopen an investigation if new evidence comes to light. The Government also sees value in the Secretary of State having powers to direct him to do so, even though we would expect these powers to be used extremely sparingly.

The results of the interesting consultation exercise that was completed to guide the development of the RAIB are available from: [http://www.dft.gov.uk/stellent/groups/dft\\_control/documents/contentservertemplate/dft\\_index.hcst?n=12290&l=3](http://www.dft.gov.uk/stellent/groups/dft_control/documents/contentservertemplate/dft_index.hcst?n=12290&l=3).

The RAIB is not yet operational and is dependent on the draft secondary legislation being approved. RAIB had targeted to go live on 13 June 2005 (with the Channel Tunnel slightly later, from 1 October 2005). However, due to issues raised recently relating to the legal framework in Scotland this date is not viable. A revised date, taking into account the needs of the rail industry, will be confirmed once these issues are resolved.



*All responses are for the proposed RAIB.*

Established	2003
Legal form of the body	public authority, state body (Department for Transport)
Current status	<i>nav</i>
Relation to the public powers	<i>nav</i>
Budget	€7300 for 2005-2006 (NB. the RAIB is not yet operational)
Personnel	54 (including 26 inspectors)
Events notified	3700 (estimated)
Events investigated	240 (estimated)
Reports published	<i>nav</i>

*Structural independence:*

Separate from the market authority	yes
Separate from the operations authority	yes
Separate from to the safety authority	yes
Permanence of the investigating body	yes
Safety investigation's legal status	yes
Safety investigator's legal status	yes
Liability issues excluded	yes
Findings cannot be used for the purposes of the judicial enquiry	yes

*Financial independence:*

Financial autonomy of the investigating body	yes
Financial autonomy to carry out investigations	yes
Absence of relations to the industry (constructors, operators or others)	yes

*Functional independence:*

Obligation to investigate	yes
Liberty to investigate	yes
Autonomous determination of the scope of the investigation	yes
Autonomous determination of the methods of investigation	yes
Access to the evidence	yes
Access to the witnesses	yes
Investigation accessible to observers of the State of design	yes
Investigation accessible to observers of the State of manufacture	yes
Investigation accessible to observers of the State of occurrence	yes
Investigation accessible to observers of the State of operator	<i>nap</i>
Investigation accessible to observers of the State of registry	yes
Investigation accessible to observers of other substantially interested State	yes
Investigation accessible to observers of other interested organisations	yes
Diverging comments of the observers published	yes
Findings are public	yes
Final report published without further scrutiny	yes
Respect of the anonymity	yes

## 6.4. Road Accidents in the UK

In the UK, there is no dedicated accident investigation body for road accidents. The nearest systems to this that are in place in the UK are described in this section.

The police conduct an investigation on all road accidents. The police investigations cannot be considered independent as they are not conducted solely for safety purposes.

Additionally to the police, some research centres conduct investigations of samples of accidents for particular research projects. To some extent, these research centres could be described as accident investigation bodies, although they are not dedicated to do such on a routine basis, and therefore cannot be classified as independent UK road accident investigation bodies comparable to those that exist for the other modes of transport in the UK<sup>31</sup>. These centres include the Vehicle Safety Research Centre (VSRC), the Birmingham Automotive Safety Centre (BASC), and the Transport Research Laboratory (TRL). The research projects that require accident investigation by these centres include the Cooperative Crash injury Study (CCIS), the Pan-European Co-ordinated Accident and Injury Databases (PENDANT) and the On the Spot (OTS) study, to name but a few.

### 6.4.1. Police Accident Investigation

When a road accident occurs, the police conduct investigations of varying levels of detail, dependent on the nature of the accident outcome. The police investigations cannot be thought of as independent because an underlying reason of any investigation that is conducted is to apportion blame if someone has done something wrong, e.g. to cause the accident. For fatal road accidents, the guidelines elaborated in the Road Death Investigation Manual (Association for Chief Police Officers, 2004) are followed. These detail how to go about the investigation and are a “*set of criteria...to enable the police service to work to a consistent standard of professional investigation*”. For non-fatal road accidents, an investigation dependent on the concerns of the officers involved, the severity of the accident outcome, and the size of the incident, is conducted. Whenever they are informed of, or attend a road accident in which someone is killed or injured, the police complete an accident booklet (HO/RT7). Accidents are those which occur on the public highway and which become known to the police within 30 days. After verification of the information, it is transferred to a Stats19 form for input to the accident database of that police force.

Data is used from Stats19 at a local level by engineers who look for indications of causation to design remedial measures, and nationally by policy-makers. The Department for Transport (DfT) compiles the national Stats19 data on personal injury road accidents, resulting casualties, and the vehicles involved. Personal injury road accidents statistics were first collected in 1909. This modern system

<sup>31</sup> Furthermore, the issue of independence depends here also on who is sponsoring the research, whether there are other involved parties and on the objectives of the study.

of collecting information on injury accidents (Stats19) was introduced in 1949. The current system was established in 1979 following a wide ranging review. Subsequently the survey has been reviewed every 5 years to check that the data collected remain relevant. Following the 1997 Review of Collection of Road Accident Statistics a substantially revised data collection form was introduced in January 2005. This collects more detailed information indicating the precipitating and contributory factors, which lead to an accident.

The DfT make the national Stats19 data available by three main areas:

1. Accidents - including the severity of the accident, the number of vehicles and casualties involved, time and location, road class and number, speed limit, weather and road conditions, and carriageway hazards;
2. Vehicles - including type, location and manoeuvre at time of accident, and details of the driver (age, sex and breath test results);
3. Casualties - age, sex, injury severity and whether a driver, passenger or pedestrian.

Data are collected on a monthly basis from police forces throughout the year and are available for Great Britain and by country region and county. Unless there has been a fatality or a serious “threat to life”, it may be subjective as to what level of detail the police investigation goes into. It could be suggested that more attention is given to cases where children are involved due to the empathic nature of the situation.

The national road accident statistics are collected and published, partly to inform public debate and partly to provide the basis for determining and monitoring effective road safety policies. It should be noted that while very few fatal accidents do not become known to the police, there is evidence that a large proportion of non-fatal accidents do not get reported to the police and therefore, there may be wide-spread under-reporting. Additionally, studies have also shown that the police tend to underestimate the severity of injury because of the difficulties in distinguishing severity at the scene of the accident, and that reporting rates are lower for the more vulnerable road users groups.

### **6.4.2. VSRC – The Vehicle Safety Research Centre**

The Vehicle Safety Research Centre is the largest crash investigation research group in the world. It conducts research into the causes of accidents and injuries in real world crashes and has made major contributions to European road and vehicle safety in many ways

The VSRC is part of the Ergonomics and Safety Research Institute within Loughborough University. The Institute brings together a broad range of expertise in the area of safety engineering and human factors.

Since its formation in 1982 the Centre has conducted over 7,000 in-depth crash investigations and has made important advances in the science of crash analysis. It has worked with the Government and used the in-depth data to support recent regulations improving the safety in front and side impacts.



Project co-financed by the European Commission, Directorate-General Transport and Energy

It is an independent research and consultancy centre producing information and recommendations to the government, the EC and industry. An objective data-driven approach, based on in-depth investigations of numerous real life crashes, provides fundamental information for legislators and road-user safety strategy engineers. Specifically, the VSRC has undertaken research over the past 20 years on behalf of the UK Government and a consortium of motor manufacturers. One study, the Co-operative Crash Injury Study, has involved the examination of some 20,000 car crashes involving approximately 25,000 vehicles and their occupants. Several other in-depth studies are being conducted for both Government and industry. The VSRC has used in-depth data to support research and legislation concerning frontal impact, side impact, leg injury mechanisms, dummy development, crash test procedures and was instrumental in the Fourth Framework STAIRS project. The VSRC also initiated a major new UK project into active safety, accident causation and road infrastructure design using “On the Spot” methods and has also commenced activity on a number of EC 5<sup>th</sup> Framework Projects including PENDANT (as project coordinators), CHILD (as work-package leaders), RISER (as work-package leaders) ECBOS and ROLLOVER.

Further information on the VSRC is available from <http://www.lboro.ac.uk/research/esri/vsrc/index-std.htm>.

### **6.4.3. TRL – Transport Research Laboratory**

TRL Limited (Transport Research Laboratory) is one of the largest and most comprehensive independent centres for the study of land transport in the world. TRL (Transport Research Laboratory) is an internationally recognised centre of excellence providing world-class research, advice and solutions for all issues relating to land transport. TRL generates sustainable solutions and creates new opportunities across a wide range of transport-related issues for their clients throughout the world. TRL is part of the Transport Research Foundation group of companies.

For more than 70 years TRL has developed research-based technical knowledge that enables clients to obtain a better understanding of transport problems and to improve value for money. As a national transport research laboratory, TRL operates worldwide and has developed close working links with many other international transport centres. It is a non-profit distributing company whose customers include central government, local and regional authorities, foreign governments, consultants and international aid agencies. TRL employs around 400 technical professionals, including engineers, mathematicians, physicists, psychologists, geologists, computer experts and statisticians.

Further information on TRL is available from <http://www.trl.co.uk/1024/mainpage.asp?page=1>.

### **6.4.4. BASC – Birmingham Automotive Safety Centre**

Originally founded by Professor Murray Mackay in 1964 to carry out at-the-scene accident investigations, Birmingham Automotive Safety Centre (formerly Birmingham Accident Research Centre - BARC) has an international reputation



Project co-financed by the European Commission, Directorate-General Transport and Energy

in the field of road accident research. BASC is currently one of the world leaders in the field of accident investigation, data processing, data analysis and impact biomechanics and has been involved in very many studies, including child seats, pedestrian injuries, motorcycle accidents and others. The Centre has always placed itself at the "leading edge" becoming involved in research looking at areas previously unexplored. As a result, BASC has been honoured with many awards, the main ones being, the Volvo International Traffic Safety Award; the United States Department of Transportation National Highway Safety Administration - Award for Safety Engineering Excellence; the Abe Merkin Award of the association for the Advancement of Automotive Medicine; the James Clayton Prize from the Institution of Mechanical Engineers; 1991 & 1993 Association for the Advancement of Automotive Medicine's Scientific Paper Award.

Restraint systems are an important subject area and considerable effort is currently being put to the understanding of occupant biomechanics and kinematics, which will aid the development of intelligent restraint systems, so called 'smart restraints.' These systems are designed to match the deployment characteristics of airbags and pretensioners with the injury threshold of the vehicle occupant, and the accident that the occupant and vehicle are involved in.

BASC recognises the importance of future work aimed particularly at accident causation factors and the "Vulnerable Road User". Previous "at the scene" work at BASC has covered pedestrian accident causation, pedestrian injury causation and pedestrian protection. That work resulted in a doctoral thesis and some 25 research publications concerning pedestrian injuries, kinematics and vehicle design. Recently the centre has taken part in the production of protocols for a new 'At The Scene' accident investigation project in the U.K., under contract to the DETR.

Further information on the BASC is available from <http://www.vtech.bham.ac.uk/basc/>.



## 7. Legal framework and accident investigation in Europe

In the field of civil aviation, there are two *specific* European Directives:

1. *Council Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents; and*
2. *Directive 2003/42/EC of the European Parliament and of the Council of 13 June 2003 on occurrence reporting in civil aviation*

The purpose of a safety (or accident) investigation, the authorised methods and practices, as well as the definitions have been set by the International Civil Aviation Organisation (ICAO) since the 1944 Chicago Convention. Accident investigations in Europe and worldwide rely on the Chicago Convention Annex 13. The first version of the Annex 13 was drafted in 1951; the current version (9<sup>th</sup>) was agreed upon in 2001.

The European Directives focus is on the structural, financial and functional independence of the investigating body. National laws adapting the international and European requirements concerning the independence of the safety investigation and of the investigation body exist in all studied Member States. All those Member States, whose accident investigation practices have been assessed during this project, have an independent civil aviation accident investigation body.

In the field of maritime transport, there is one *general* European Directive:

1. *Council Directive 1999/35/EC of 29 April 1999 on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high-speed passenger craft services*

The purpose of a safety (or accident) investigation, the methods and practices, as well as the definitions have been set by the International Maritime Organisation (IMO). The accident investigation in Europe and worldwide tends to respect the IMO Code for the Investigation of Marine Casualties and Incidents, agreed upon by the Resolution A849/20 from 1997.

The European Directive structures the maritime transport in a quite general manner. It is not specific to accident investigation and does not require the Member States to establish an independent investigation body. However, the Directive's aim is to ensure the harmonised enforcement of some principles agreed upon within the IMO and particularly the IMO Code for the Investigation of Marine Casualties and Incidents. The IMO Code states that *ideally* an investigation on a marine casualty should be separate from, and independent of, any other form of investigation. Therefore, while the Member States have no formal obligation to establish an independent investigation body for the investigation of marine casualties, this remains an objective. National laws



adapting the international and European requirements concerning the independence of the safety investigation and of the investigation body exist in Germany, France, Finland and United Kingdom.

In the field of rail transport, there are three *general* Directives:

1. *Council Directive 91/440/EEC on the development of the Community's railways amended by the*
2. *Directive 2001/12/EC of the European Parliament and of the Council of 26 February 2001; and*
3. *Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railways*

The purpose of a safety (or accident) investigation, the methods and practices as well as the definitions are set by the 2004 Directive. It requires the Member States to establish an independent accident investigation body. The European Directives structure the rail transport in a quite general manner. The International Union of Railways (UIC) uses the European definitions for its Safety Data Base project. National laws adapting the European requirements concerning the independence of the safety investigation and of the investigation body exist or will shortly be acted in all studied Member States.

In the field of road transport, there are no European Directives or Regulations nor any other international legal framework. National laws on the safety (or accident) investigation and the investigation body exist in France and in Finland.

Italy, Germany and United Kingdom have opted for separate investigation bodies for different transport modes. France has opted for separate investigation bodies for civil aviation and maritime, while all the land transports are investigated by one body. Finland has an investigation body for civil aviation and all major accidents, whether they involve a mode of transport or not, and another system for investigating road and cross-country accidents.

The table 1 on the next page summarises the situation.

<i>Table 1. LEGAL FRAMEWORK ON SAFETY INVESTIGATION AND DEDICATED INDEPENDENT INVESTIGATING BODIES IN DIFFERENT TRANSPORT MODES</i>					
	<b>AVIATION</b>	<b>MARITIME</b>	<b>RAIL</b>	<b>ROAD</b>	<b>OTHER</b>
<b>INTERNATIONAL LEGAL FRAMEWORK</b>	ICAO Chicago Convention 1944; Annex 13 1951 (9th version 2001)	IMO Resolution A849/20 Code for the Investigation of Marine Casualties and Incidents 1997			
<b>EUROPEAN LEGAL FRAMEWORK</b>	Directive 94/56/EC establishing the fundamental principles governing the investigation of civil aviation accidents and incidents; Directive 2003/42/EC on occurrence reporting in civil aviation	Directive 1999/35/EC on a system of mandatory surveys for the safe operation of regular ro-ro ferry and high-speed passenger craft services	Directive 91/440/EEC on the development of the Community's railways amended by the Directive 2001/12/EC; Directive 2004/49/EC of the European Parliament and of the Council on safety on the Community's railways		
<i>NATIONAL LEGAL FRAMEWORK AND DEDICATED INVESTIGATING BODIES</i>					
<b>ITALY</b>	Legislative decree 25-02-1999, n. 66 ANSV (1999)		Directive 2004/49/EC is in the process of adaptation		
<b>GERMANY</b>	Flugunfall-Untersuchungs-Gesetz / FIUUG August 26th, 1998 BFU (1998)	Seesicherheits-Untersuchungs-Gesetz / SUG June 22nd, 2002 BSU (2002)	EBA (1994)		
<b>FRANCE</b>	Law 99-234 of 29/3/1999; Decree 2001-1043 of 8/11/2001 BEA civil aviation (1946)	Law 2002-3 of 3/1/2002; Decree 2004-85 of 26/1/2004 BEAmer (1997)	BEA-TT (2004)		
<b>FINLAND</b>	The Accident Investigation Act (373/1985); Decree 12.2.1996/79 Accident Investigation Board (1996)			Act on the investigation of road and cross-country traffic accidents (24/2001)	
				Road Accident Investigation Delegation and Teams (2001)	
<b>UNITED KINGDOM</b>	The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996 AAIB (1915)	The Merchant Shipping (Accident Reporting and Investigation) Regulations 1999 MAIB (1989)	Directive 2004/49/EC is in the process of adaptation RAIB (2003)		

It is clear, based on the preceding, that road accident investigation differs from the accident investigation in other transport modes. Only two of the Member States, whose accident investigation practices have been assessed, have a legal national framework applicable to road accident safety investigation. In France, the decision on opening a safety investigation on a road accident is taken by the Minister of transport. In 2004, only three accidents involving road traffic vehicles were investigated. In Finland, all fatal road accidents and some non-fatal road accidents are investigated. On average, some 500 road accidents, out of which 370 fatal, are investigated annually.

Having highlighted this problem, it is worth reminding that the quality or independence of an investigation process is logically separate from the issue of independence of the body conducting that investigation. There are no valid reasons for assuming *a priori* that an assessed lack of independence of the investigation body inevitably hampers the investigation process. We have seen that wearing several hats puts NHTSA in a somewhat uncomfortable position. In that particular case, the main problem seems to arise from the ties it has to the manufacturers as the authority responsible for the safety regulations and for the safety investigation. However, the lack of structural independence of the investigation body does not automatically bring discredit on that body. The French STRMTG, which has regulatory and investigation activities, enjoys an excellent reputation both in France and abroad. According to the director of STRMTG the (lack of) independence of the body has never been an issue. The entire framework in which the STRMTG evolves, integrates not only constructors, but also operators and consumers. There is no doubt that this type of functioning is beneficial for STRMTG in that it strengthens its impartiality, but also for all parties and in particular the consumers in that it provides information on the investigation body and the investigation processes.

CEESAR could be another problematic French example. This association has, among its members, universities and business schools, automobile constructors, car parts manufacturers, insurance companies and personalities of medicine and industry. Some of the members certainly might have financial interest in the results of an investigation conducted by CEESAR. Some other members cannot be suspected of having such interest in the results of the investigations it conducts. The presence of financially interested parties among the members of the association and the lack of financial independence of CEESAR are facts that need to be taken into account but they do not mechanically disqualify the results of its investigations.

Finally, the bulk of the research in road safety in all involved Member States, with the exception of Finland, is made by research bodies that do not have the *legal* status of a body responsible for conducting safety (or accident) investigations. This statement of fact raises two questions.

1. Why is there such a difference in accident investigation practices between road traffic and other transport modes?

2. Does the clear lack of independence of investigation bodies, i.e. the lack of legal framework for road accident safety investigation, in several Member States, hamper the road safety research?

These questions will be adequately addressed in the Deliverable D4.2 which will analyse the independence of road accident databases and actual road accident investigations processes.

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## 9. Annex: European databases

SafetyNet Work Package 4 intends to develop adequate instruments for evaluating the independence of existing road safety research. The Work Package will elaborate recommendations for future research with the aim to ensure independence in terms of data quality as well as in terms of the output of public databases or public use of any European database.

Task 4.2 will look at the range of existing databases in order to evaluate the levels of independence of the data and the crash investigation process as well as the use to which the data has been put. The purpose of the data gathering and/or the purpose of the database will be taken into account in the evaluation. The identity of the data collector and the investigation methodology it uses will also be examined. Specific information about the data processing and the availability of the data for further independent scrutiny are factors that will be assessed within EU.

Our purpose is to identify here the European databases we will take under scrutiny in task 4.2 and that will, along with some national databases, be evaluated.

## 9.1. CARE – Community Road Accident Database

The Community Road Accident Database (CARE) comprises statistical information of reported road accidents in the European Union resulting in injury or death since 1991. Accidents resulting only in material damage are not included in the database. The main difference between CARE and most other international databases is the high level of disaggregation of the accident data; it contains detailed data on individual accidents as collected by the Member States.

The Council Decision (93/704/EC) requires Member States to establish road accident statistics and to communicate these data for a given year to the Statistical Office of the European Communities. Instead of defining and adopting standardised European collection methodology, data variables and variable definitions, which would have been a quite lengthy process and would have required major changes for the national administrations, the national data sets are integrated into CARE database in their original national structure and definitions but without any confidential data.

Each Member State therefore produces its own road accident statistics following its own standards and using national statistical formats. Member States submit their data in the form of a report to the European Commission. The reports exclude confidential information like the precise location of the accident or the make of vehicle. The Member States provide also the necessary information on the definitions and the structure of the data. Each Member State is responsible for the quality of its data and is requested to validate its data after inclusion in the CARE database. The information from the CARE database should therefore correspond to the information extracted from the national database.

The CARE database comprises annual national sets of accident data in their original form supplied by the Member States without harmonisation of individual variables. CARE provides a framework of transformation rules from an analysis of the original structure and definitions to ensure the compatibility of data variables and values. Harmonising the data contained inside the database allows European comparisons and exchange of experiences between Member States.

CARE database includes more than 20 million accident records and it is representative of all the accidents resulting in injury or death, that have occurred in the 15 Member State involved in the project since 1991. The process of integrating the new Member States into CARE is under way, as is the process of developing the database by defining new common variables.

More information about CARE on [http://europa.eu.int/comm/transport/care/index\\_en.htm](http://europa.eu.int/comm/transport/care/index_en.htm).



## 9.2. EACS – European Accident Causation Survey

The European Accident Causation Survey (EACS) is a research project that was launched by the European Automobile manufacturers Association (ACEA) and the European Commission in 1996. The project aim is to collect accurate information on the causes of road accidents. It focuses on the pre-crash phase, particularly on vehicular factors and safety systems (e.g. ESP); less depth data are reported on injuries.

Accident data were recoded from existing files in contributing organisations because the project did not support data collection activities. Therefore, data are recorded according to national protocols although specific data coding methodology (EACS methodology) were defined in order to harmonized data and ensure consistency across countries.

Expected outcomes of EACS were the identification of critical situations, the analysis of counter-measures effectiveness, some help in designing new technical devices, the understanding of accident genesis, the analysis of malfunction of the "driver/road/vehicle" loop, the definition of typical accident scenarios, the ranking of priorities for crash avoidance and the definition of a detailed accident collection form and methodology.

Data were collected by nine research institutes: DEKRA and MUH for Germany; CEESAR (project co-ordinator) and INRETS for France; Univesity of Oulu and Turku from Finland, INSIA from Spain, TNO for The Netherlands and ELASIS for Italy. Up to June 2000, 1,674 accidents cases had been investigated and coded in the so-called DAMAGE database (a Databank to analyse Accident Mechanism and Accident Genesis in Europe). All records refer to crashes involving cars where an occupant is injured.

Since the project did not include any data collection campaign, existing data were used to create a common database. To ensure data harmonisation and consistency, a specific coding protocol was defined. It was based on a common *questionnaire* structured as follow:

- an *Accident General Form* per accident,
- a *Road Infrastructure Form* per vehicle,
- a *Vehicle Form* per each type of involved vehicle,
- a *Vehicle Occupant Form* per occupant in concerned vehicle,
- a *Pedestrian Form* per pedestrian,
- a *Reconstruction Form* per vehicle.

Furthermore, two additional forms, which are only indirectly related to the accident causation were defined:

- a *Secondary Safety Parameters* form (included in the other forms),



- a *Witness Information* form (used to complete the available information).

One accident may involve several Roads, Vehicles, Vehicle Occupants and/or Pedestrians. So every part can be used once or more.

The database was structured like the questionnaire in order to obtain the most effective data processing: each form represents one table.

Moreover, to ensure the easy handling of data input, a data capture software tool was developed; input masks are oriented to the structure of the EACS's associated questionnaire forms reported above.

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### 9.3. ECBOS – Enhanced Coach and Bus Occupant Safety

The ECBOS project took place under the 5<sup>th</sup> Framework Programme. The project ran from January 2000 to June 2003. Current knowledge on the optimum protection of passengers in buses and coaches was still rather limited, particularly the importance of different accident and collision types which are still not well analysed. The ECBOS project was developed to make improvements in current regulations and propose new regulations and standards for the development of safer buses and coaches. The major community added value is the decrease of incidence and severity of occupant injuries and social suffering which occur as a result of bus and coach accidents. In the EU approximately 20,000 (4%) of buses and coaches of more than 5,000 kg are currently involved in accidents with personal injuries each year. More than 30,000 persons are injured due to these accidents and about 200 occupants suffer fatal injuries.

ECBOS was split into 4 work packages. WP 1 investigated two different kinds of databases. The Governmental databases of different countries were investigated in a first step to see the injury risk in relation to the different accident types. The injury mechanisms were not well known for many of these different accident situations, so in-depth studies of specific accidents were performed. Out of the governmental accident databases of each involved country, a statistical analysis of all bus accidents was performed regarding criteria relevant for active and passive safety. The last 5 available years of accident data were investigated. Based on the results of this task, 100 significant accidents were selected for in depth studies from the extended data base. Therefore the partners active within this task reviewed the extended databases to identify suitable cases for detailed reconstruction. The data from the various sources (Governmental- and Extended) databases were integrated into a general bus accident database

The in-depth studies, which were based on well documented bus accidents, gained from various existing databases formed the basis for a set of new numerical simulation models developed in WP 2. These numerical models in combination with accident and full scale reconstructions generated the knowledge necessary to understand the various occupant injury mechanisms. In WP 3 these numerical models, component- and full-scale tests were used to develop new numerical and experimental test methods for the validation of driver and occupant safety in buses. The various test methods will be compared through a cost benefit analysis. In WP 4 written standards were suggested based on those newly developed test methods. Their efficiency was demonstrated by means of numerical models for improved bus and coach designs.

More information about ECBOS on [www.dsd.at/ecbos](http://www.dsd.at/ecbos).



## 9.4. CHILD – Child Injury Led Design

The CHILD project started in 2002 with partners from 6 different countries and is a follow up of the CREST project. The object of the CHILD project is to increase the knowledge in areas regarding children, based on the results obtained in the CREST project. One part of the CHILD project is to collect accident data and put it into a database together with the data of CREST.

The objective is to obtain in-depth accident data, that allow the reconstruction of accidents and to find out about injury mechanisms in relation with protection devices.

CHILD is expected to collect the data of some 300 accident cases which have a full compliment of:

- Information about the crash scene (scene plan with impact position and configuration; vehicle trajectories; post crash vehicle positions and photos of the scene)
- Information about the vehicles/obstacles (measurements of the vehicle deformation; photos and description of damage; information about the object size, weight, constitution, location, damage)
- Information about the child restraints used (Type; make and model; condition; evidence or suspicion of misuse)
- Information about the occupant (detailed injury data, AIS coded; autopsy information if possible; seating position; specific restraint use; age; weight; height)

The case data put into the database are mostly collected by retrospective accident investigation and are chosen by the selection criteria. For the CHILD database only cases with the following criteria are used:

- At least one child up to 12 years, correctly restrained has to be involved
- only accidents with frontal or side impacts are used
- a minimum severity of accident and injuries is required
- misuses of restraint are accepted if well defined and possible to reproduce

The accident data is used to enable the reconstruction that will permit the consolidation or establishment of injury criteria and injury risk curves. Furthermore the cases contained in the database are being analyzed periodically to consider injury pattern, CRS use/misuse. In addition, the information will be disseminated to other bodies dealing with child occupant safety.

More information about CHILD on

<http://www.lboro.ac.uk/research/esri/vsrc/research/child%20web%20site/>.



Project co-financed by the European Commission, Directorate-General Transport and Energy

## 9.5. RISER – Roadside Infrastructure for Safer European Roads

RISER is a European road safety focused project co-financed by the European Commission through its Competitive and Sustainable Growth Programme that will last for 36 months (from December 2002 to December 2005). Safety on roads can only be achieved through innovative solutions, which recognise that the infrastructure is a determining factor in the origin and seriousness of road accidents. In particular, almost a third of road fatalities are linked to single-vehicle accidents. At the same time there is no European consensus on the appropriate design, implementation and operation of road safety devices. Well-researched operational guidelines to roadside infrastructure design and maintenance can play a significant role in ensuring that motorists no longer are the victims of poorly designed, built and maintained roadside infrastructure. The overall objective of RISER is to provide resources and guidelines for highway safety professionals to design and operate safer roadside infrastructure. These resources will allow the stakeholders to identify the best design for a given road section based on objective and technically supported guidelines. Once in place, operation and maintenance guidelines will ensure that the infrastructure continues to operate as desired. With these project deliverables, a significant reduction in the number of single vehicles collisions – and especially their consequences – can be achieved.

The purpose of a major deliverable was to generate databases and database structures for statistical and detailed data of single vehicle collisions in Europe. Statistical data provides the basis for determining the relevance of single vehicle collisions in Europe. Detailed collision data is necessary to determine the specific performance of roadside infrastructure. In the first phase of the project the statistical data from Austria, Finland, France, Spain, Sweden, the Netherlands and United Kingdom were collected and the coding strategies were summarised. This work showed that differences in the collecting and analysing of data exist between these countries. Nevertheless, these data were harmonised and a common form was defined to build a representative European database to compare the large amount of data and to identify the distribution of the different accident types and their causes and to provide data and guidance for further investigations.

Another objective of the RISER project was the set up of a detailed database for single vehicle accidents which includes data not available from national statistic data. Therefore a database was created based on the STAIRS protocol (*“Values and Variables for: the STAIRS project; STAIRS - Work Package 1.ii”*). These values and variables were adapted and adapted to the RISER project and a MS-Access database was designed with new data entry forms for the RISER specific data to ensure that all partners can work with the same tools and that the data are comparable. ‘In depth accident analysis’ accident cases were selected from existing databases for an in-depth study to derive the circumstances of roadside accidents and their outcomes.



Maintenance data were collected to evaluate a potential source of collision statistics. These data will be further investigated to understand the utility of this data resource. HIASA has investigated the data available from road operators in Spain and how this can be applied to roadside collisions.

More information about RISER on <http://www.riser-project.com>.



## 9.6. PENDANT – Pan-European Co-ordinated Accident and Injury Database

The PENDANT (Pan-European Co-ordinated Accident and Injury Databases) project runs from January 2003 to December 2005. The project brings together 11 partners from 8 EU countries and it is co-financed by the European community. PENDANT is an in-depth study on road accidents with injuries. The target of the study is to provide in-depth vehicle crash and injury data to support European vehicle and road safety policy.

The project is developing two European databases with the capacity for continuation after the completion of the project.

The first database will contain in-depth crash and injury data of over 1100 injured car occupants and pedestrians from 8 EU countries. The groups collecting the data cover northern, middle and southern Europe in order to give a representative range of accident conditions.

The data will be able to explain the causation mechanisms of injuries of car occupants and pedestrians with a high level of detail. Over 400 collected variables contain information about the accident environment, facts about the involved vehicles, details about vehicle damages, personal information and injury information.

The second database will use hospital injury data of all road user types that already exists in three EU countries. The data will give a medium level of detail on injuries for large numbers of all types of road users.

When established, the in-depth crash and injury database will be used to examine the injury prevention priorities for future action and to provide feedback to casualty reduction measures such as the EuroNCAP rating system.

More information about PENDANT on <http://www.vsi.tugraz.at/pendant/>.



## 9.7. ETAC – European Truck Accident Causation Study

This project, initiated by the European Commission and the IRU (International Road Transport Union), was launched in order to set up a heavy goods vehicle accident causation study to identify future actions which could contribute to the improvement of road safety. The project commenced on 1 May 2004, due for completion on 31 March 2006. The Centre européen d'études sur les accidents et l'analyse des risques (CEESAR) in France are the coordinating research group, with institutes from seven other European countries involved. The aims of the project are:

- To investigate at least 600 truck accidents in order to identify the causal factors of these accidents
- To provide a database of truck accidents containing road accident criteria, established in a scientific, unbiased, independent manner and permitting better knowledge of the causes of truck accidents
- To permit the identification of actions contributing to reduce truck accidents and/or their seriousness and, generally, to the improvement of road safety.

This survey is based on a prospective, 'on-the-spot' investigation of the accident. It means studying the road dysfunction process, the cause and effect relationship, on the basis of detailed data collection. In-depth data from accident cases will be collated, including aspects of passive and active safety, with road user behaviour, vehicle mechanisms and injuries sustained being examined. This information will be gathered as close to the time of the accident as possible, using driver interviews, eye witness testimonies, scene examinations, and police records. The sampling criteria state that each accident investigated must involve at least one truck (commercial vehicle of Gross Weight >3.5t), all accidents must involve at least one injured person and all cases must refer to accidents having occurred as from 1 April 2004.

The ETAC database will permit the:

- Identification of the main causes of accidents involving trucks
- Reconstruction of the precollision phases
- Identification of critical situations;
- Analysis of malfunctions;
- Definition of scenarios of accident types;
- Study of the information needed by drivers in the "pre-collision" phase;
- A priori quantification of the potential interest of certain driver aids.

More information about ETAC on  
<http://www.iru.org/Presenting/Welcome.E.html>.



Project co-financed by the European Commission, Directorate-General Transport and Energy

## 9.8. SafetyNet WP5

SafetyNet Work Package 5 aims at building up two European databases. One will be a broad-ranging, intermediate level, fatal accident database, while the other will be an in-depth accident causation database. The Work Package relies on the existing structures put in place by the PENDANT project.

The data will be collected using harmonised methodologies and identical definitions of variables. The data will be representative of the Member State where it is collected. The Member States involved are from northern, western and southern Europe. The new central European Member States do not participate to the project. The entities involved in the project and in charge of the investigation and data collection have no commercial interests at stake.

The intermediate level database will provide support for policy making. The sample will integrate between 2% and 10% of the fatal accidents in the participating Member States. The data will be a great deal richer than the CARE data with over 100 variables, addressing environmental and infrastructure factors, vehicle and driver factors as well as casualty factors.

The in-depth accident causation database will be useful for technology development activities and infrastructure development. While the intermediate level database is comparable to the U.S. Fatality Analysis Reporting System, there is no direct model for the in-depth database. The database will contain over 400 variables on the accident circumstances.

The database development takes into account the privacy laws of Member States.

Due to the nature of this task, WP4 and WP5 have been liaising closely to benefit from the knowledge and experience available. Particular emphasis has been given to issues of independence for data collection techniques and data storage. Technical meetings have been run in parallel and with many similar partners being involved in WPs 4 and 5, this has enabled sharing of information and a close relationship during the development of both projects.

More information about SafetyNet on [www.svow.nl/safetynet](http://www.svow.nl/safetynet).

