

## **TAXI TECHNOLOGY** Europe

The comprehensive guide to specialist solutions, equipment and technology in Europe's taxicab sector

### **VOLUME 1:**

Products, technologies, legislation, national profiles and market forecasts

### **VOLUME 2:**

Profiles of Europe's largest and most innovative manufacturers



# An Outline Of This Report

This report provides a comprehensive explanation of the European market for cab-equipment. It consists of two volumes. Volume 1 contains a study of the market in terms of products and technologies, legislation, market value and regional variations. Volume 2 provides profiles of over fifty producers of cab-equipment for the European market.

Volume 1 begins with an overview of the European market for taxicab equipment. This serves to set the in-depth analysis that follows in context. The research undertaken for this report suggests that the European market for the sale, licensing, and maintenance of equipment and related services was worth an estimated €620M in 2010. This value is based on the price paid by end-users (such as drivers or taxi organisations) and is exclusive of Value Added Tax. It is important to note that many manufacturers do not sell directly to end-users, and much of the market-value is won by installers, systems integrators and local agents.

The market has been analysed in six segments. The information in Chapters 2 to 7 explains and analyses each of these segments and forms the basis of the market forecasts that are provided.

Chapter 2 examines the market for **taximeters** – one of the most familiar items found in Europe's taxicabs. It explains the key technical and functional characteristics of meters and how these are used in different jurisdictions. It also explains the Measuring Instruments Directive (MID) which has been implemented across Europe, and the procedures that manufacturers must now follow to ensure acceptance of their meters on the market. It identifies the key drivers of taximeter sales and quantifies the market value for 2010, as well as providing 5 year forecasts until 2015.

Chapter 3 provides a full analysis of the use of **communication technologies** in the taxicab sector. The market for communication systems for cabs is currently undergoing a dramatic change. The position of well-established technologies is being partially usurped by the advent of public mobile networks and increasingly cheap smartphones that can function as MDTs. The Chapter begins with a comprehensive explanation of the wireless technologies used by vehicles to communicate with central dispatch offices: Professional Mobile Radio (PMR); Public Access Mobile Radio (PAMR) and Public Land Mobile Radio (the ubiquitous GSM-based mobile telephony system).

The key components of wireless systems are discussed as well as industry trends such as emerging new radio standards and the gradual migration from analogue to digital PMR.

Chapter 3 compares the merits of the competing technologies of PMR/PAMR with GSM, and shows why the latter is capturing a growing proportion of new vehicle installations. This is followed by an evaluation of the relative merits of using Mobile Data Terminals, versus Smartphones or Personal Digital Assistants (PDAs), as in-vehicle terminals for cabs.



Chapter 4 outlines the characteristics for **communications, dispatch and management systems** in Europe. Systems that cater for some or all of these activities now constitute one common segment of the market, as more and more systems are available that cater for all of these activities in one solution. Few vehicles now communicate solely with a dispatch operator by voice. Instead, they use data transmission and are integrated with sophisticated back office systems that facilitate a range of functionality. This chapter explains the key functionality of these systems including automatic vehicle location (AVL) using GPS; data dispatch; customer ordering by telephone operator, text, web and Interactive Voice Response (IVR); report generation and billing. The chapter concludes by quantifying the existing scale of the market for such systems, and providing five year forecasts.

Chapter 5 provides a full description of the use of **cashless payments in cabs**. In Europe, the cab sector is a laggard in the adoption of payment cards and other forms of electronic payment for taxi trips. However, there are exceptions, particularly in some large cities. Furthermore, the evidence from North America and the Far East is that cashless payments in taxis are destined to become more common.



Chapter 5 begins by explaining the general payment card market in Europe, in terms of the penetration rates of both payment cards and Point Of Sale (POS) Terminals in various countries as well as the adoption of mobile payments. This is followed by an analysis of credit card processing in taxis. It shows how the deployment of Chip & PIN verification is rising, but that offline processing remains most common. The chapter also provides an existing and forecast expenditure on card processing equipment that shows it to be modest; however, as discussed by citing real examples in the relevant section, this masks the very large returns that can be made from card surcharges and transaction fees by the players involved.

In addition to the core pieces of equipment found in cabs, there are a number of **peripheral devices** that constitute a valuable if highly fragmented market. These include roofsigns, security systems and digital screen applications. These are profiled in chapter 6. The chapter also provides individual estimates and five year forecasts for the various strands of peripheral devices in the European market.

**Roofsigns** are compulsory in almost all markets and are used by taxi regulators in increasingly sophisticated ways. In some cities such devices are often linked to the taximeter to signal not only the occupancy status of the vehicle but also the fare that is being applied by the meter, and the installation of such a device can cost up to €800.

**Security systems** in cabs are also a growing sector, in part due to the subsidies towards the purchase of such systems in some regions, and the fact that they are now compulsory in other countries.

The advertising revenues earned by cab firms through displays on vehicle panels is not a topic included in this report, since it does not generally involve expenditure on technology. However, it is relevant in so far as it overlaps with the still embryonic deployment of **digital screens** in taxis for the purposes of advertising, entertainment and even payment card processing in cabs. A discussion of the relevant deployments of such devices in Europe is included.



Public transport regulators, tax authorities and enforcement bodies are now aware of the ability of new technology to automatically monitor the activities of taxicab drivers. Chapter 7 provides detailed analysis of the use of **specialised equipment** for such purposes in Europe. This chapter shows how different equipment is used to limit the hours worked, to ensure compliance with licensed shifts, to monitor fiscal record keeping and to automatically record details including the origin and destination of each journey.



Chapters 2 through to 7 outline the key segments of the cab equipment market, and provide market valuations and forecasts for each. Chapter 8 of Volume 1 presents **separate profiles for Europe's fifteen most advanced or most valuable national markets**: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Poland, Spain, Sweden, the United Kingdom and Norway. Each profile provides an explanation of the regulatory environment including the number and types of small public service vehicles, and the quotas on vehicle and driver numbers. The largest dispatch operators in each country are identified, and an estimate of the proportion of the national fleet that is affiliated to a dispatch centre is provided. The manufacturers of the most popular equipment found in the market are listed, and any obligatory equipment is outlined. A separate forecast of the annual expenditure by end users on taxicab solutions, from 2010 to 2015, is provided for each country. Chapter 9 summarises the findings of the report and draws a number of conclusions.

Volume 2 **provides detailed profiles of over fifty of Europe's largest and most innovative manufacturers** of equipment for small public service vehicles (SPSVs). Some are enterprises such as taximeter manufacturers dedicated solely to the SPSV sector, while others are producers of more general equipment such as radios or card payment systems that enjoy significant popularity in taxicabs. Many also provide dispatch and fleet management systems. Volume 2 consolidates the information given on manufacturers in Volume 1 and also adds additional information on the activities of each company, its key products, and the markets that it serves. Relevant contact details are listed, so that readers can further investigate any specific technical or pricing queries that they may have.

# Vol. 1 - Table Of Contents

## Executive Summary

### 1. Introduction and Overview

- 1.1 - Introduction
- 1.2 - Overview – How diverse regulation fragments the market
- 1.3 - Equipment Categories
- 1.4 - Structure of This Report
- 1.5 - Research and Acknowledgements
- 1.6 - Conditions of Use
- 1.7 - Disclaimer
- 1.8 - Correspondence

### 2. Taximeters & Ancillaries

- 2.1 - Introduction
- 2.2 - The supply and installation of taximeters
  - 2.2.1 - Manufacturers
  - 2.2.2 - Distribution Channels
  - 2.2.3 - Verification and Sealing
  - 2.2.4 - Registered Installers
- 2.3 - Functionality and Technology
  - 2.3.1 - Totaliser
  - 2.3.2 - Fiscal Functions
  - 2.3.3 - Printers
  - 2.3.4 - Software
- 2.4 - The European Measuring Instruments Directive
  - 2.4.1 - Derogation Period
  - 2.4.2 - Conformity Assessment
  - 2.4.3 - Functional Requirements
  - 2.4.4 - The effect of the MID on the European taximeter market
- 2.5 - The Demand For Taximeters in Europe
- 2.6 - Market Value and Forecasts

### 3. Communications Technology in the SPSV Sector

- 3.1 - Introduction
- 3.2 - Communications in the SPSV Sector
- 3.3 - Communications Networks
- 3.4 - An overview of PMR/PAMR
  - 3.4.1 - Key trends
  - 3.4.2 - System Characteristics of PMR/PAMR
  - 3.4.3 - Functional Characteristics of PMR/PAMR
  - 3.4.4 - Standards
  - 3.4.5 - The move to digital
  - 3.4.6 - Compliance Requirements for PMR in Europe
  - 3.4.7 - The European Market for PMR/PAMR
- 3.5 - An Overview of Public Land Mobile Radio (PLMR)
  - 3.5.1 - Introduction
  - 3.5.2 - The Evolution of Europe's Digital PLMR Network
  - 3.5.3 - Location Based Services
- 3.6 - A Comparison of PMR and PLMR
  - 3.6.1 - Critical Differences
- 3.7 - Mobile Data Terminals and Consumer Devices
- 3.8 - Other Applications of Communications Technology

### 4. Communications, Dispatch and Back Office Systems

- 4.1 - Introduction
- 4.2 - Dispatch System Functionality
- 4.3 - Integration with Public Systems
- 4.4 - Smartphone Applications
- 4.5 - Market Outlook

### 5. Payment Cards in Europe

- 5.1 - Introduction
- 5.2 - The European Card Payments Market
  - 5.2.1 - Overview
  - 5.2.2 - Payment Card Types
  - 5.2.3 - Payment Card Schemes in Europe
  - 5.2.4 - Technical Dynamics
  - 5.2.5 - Contactless Chip Cards
  - 5.2.6 - Mobile Payments
- 5.3 - Payment Cards in Taxis
  - 5.3.1 - Overview
  - 5.3.2 - Early Adopters
  - 5.3.3 - Key Markets for Payment Cards in Taxis
  - 5.3.4 - Other Card Administration
  - 5.3.5 - Market Outlook

### 6. Vehicle Peripherals

- 6.1 - Introduction
- 6.2 - Roof Signs
- 6.3 - Security Systems
- 6.4 - Advertising and Entertainment

### 7. Third Party Supervision Systems

- 7.1 - Introduction
- 7.2 - Automatic Electronic Recording of Trips
- 7.3 - Shift Compliance Clocks in Taxis
- 7.4 - Encrypted Digital Storage of Taxi Payment Transactions
- 7.5 - On Board Computers in Taxis
- 7.6 - Fiscal Taximeters and Cash Registers

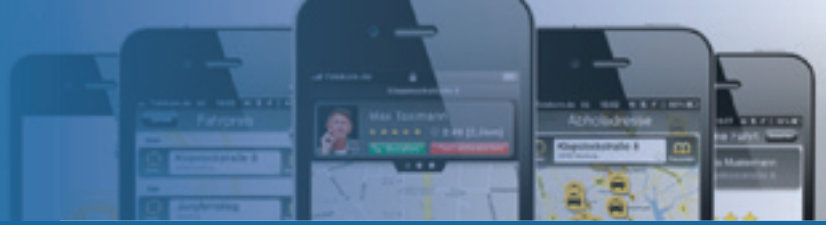
### 8. National Profiles

- 8.1 - Introduction
- 8.2 - Austria
- 8.3 - Belgium
- 8.4 - Denmark
- 8.5 - Finland
- 8.6 - France
- 8.7 - Germany
- 8.8 - Greece
- 8.9 - Ireland
- 8.10 - Italy
- 8.11 - The Netherlands
- 8.12 - Norway
- 8.13 - Poland
- 8.14 - Spain
- 8.15 - Sweden
- 8.16 - The United Kingdom

### 9. Summary & Conclusions

- 9.1 - Market Segments
- 9.2 - National Profiles
- 9.3 - Manufacturers
- 9.4 - Conclusions

# Vol. 2 - Contents



**Volume 2 provides 110 pages of detailed profiles of over fifty of Europe's largest and most innovative manufacturers of equipment for taxicabs.**

Some are leading pan-European specialists such as ATA Gleike, DDS Wireless, Digitax, Heedfeld Elektronik, Kienzle Argo Taxi International and Taxitronic Intefacom. Others are general producers: these include radio equipment specialists such as Kenwood, Icom, and Motorola and cashless payment experts like Ingenico and Verifone. Many of those profiled are little known regional operators whose innovation has given them a leading position in a number of markets. They include manufacturers of on-board computerised solutions, fiscal meters, taxi queue detection systems, and cashless payment solutions as well as providers of dispatch and management systems that have been expertly tailored to local market-needs and languages. The profiles contain full contact details and product portfolios for all of those profiled, as well as additional information on key customers and markets.

## Who should read this report?

- Regulators, licensing boards and supervisory authorities who wish to understand the governance of taxicabs in other jurisdictions, and how technology is used and mandated
- Equipment Manufacturers seeking competitive intelligence and emerging market opportunities
- Taxicab organisations undertaking large investment decisions
- Automotive manufacturers who serve the taxicab sector
- System integrators that are seeking to understand the myriad of technologies in use
- Distributors and installers that wish to identify opportunities to align with producers to address the taxicab market
- Mobile Network Operators and Professional Mobile Radio Specialists
- Telematics Providers
- Consultants and Industry Professionals that serve the Transportation Sector

## What kind of questions can this report answer?

- In which European countries are the largest markets for cab equipment?
- Where can I find separate profiles of the regulatory and market conditions in individual countries?
- Which strands of equipment sales are most lucrative and which will show the greatest growth in the coming years?
- Who are the fifty most significant and innovative players in the manufacture of taxicab technology in Europe, and what are their principal markets and activities?
- What country will provide a once off boom in the sale of taximeters in the next three years?
- What opportunities in payment card processing exist within the cab industry?
- In which regions are all vehicles required to be affiliated to a central dispatch centre?
- How are the operators of Public Mobile Networks taking market share from Professional Mobile Radio?
- Can smart-phones really provide a satisfactory alternative to Mobile Radios and Data Terminals?
- What will be the implications of the European Union's Measuring Instruments Directive for the taximeter market?
- Where are third parties such as the police and taxi regulators using electronic equipment to automatically monitor driver activity?
- Which Finance Ministries are likely to be next to mandate fiscal functions in taximeters?
- Where are on-board computers currently required and where are large public subsidies being offered to install such equipment in vehicles?
- Who leads the way in the provision of automated parking and queue control systems for taxis at European airports?
- How are smartphone applications for passengers challenging the classic dispatch model?

# About The Author

Raef Mac Giollarnáth is a Principal Consultant at Limatel. He has provided research and consultancy services to clients in the public and private sectors since 2003. His work covers a broad range of transportation and telecoms activity. This includes working on major projects with public transport operators and regulatory authorities in the bus, rail and taxicab sectors.



*Raef Mac Giollarnáth*

Prior to working as a consultant, Raef held a number of senior roles in transport and technology companies. He was formerly the head of strategy for Eircom Enterprises, a division of Ireland's largest telco. Raef also previously worked as a Senior Engineer in the Planning and Projects Department of the CIÉ Group, Ireland's biggest transport operator. In that capacity he analysed the engineering and commercial feasibility of a varied range of proposals in the transportation sector; including bus, rail, and seaport projects.

## Research & Acknowledgements

Research for this report was undertaken over the period March 2010 to June 2011. Information was obtained from a variety of published sources including websites; taxi and radio magazines; company annual reports and presentations; product brochures and technical manuals; studies undertaken by or on behalf of regulatory bodies; and the general business press.

In addition, interviews and correspondence were undertaken with over fifty key personnel working in the European taxicab sector.

These include taxi and private hire associations; technical experts and executives working for the manufacturers of taximeters, back office systems for dispatch centres, card payment terminals and radio systems; regulators in State and Municipal departments; executives in legal metrology authorities; and large equipment installers. The publisher wishes to acknowledge their assistance and enthusiasm for the project and to sincerely thank them for giving of their time and expertise. Much of the value of this report lies in the previously unavailable information that they provided.

### Conditions Of Use

All rights, including copyright, are reserved to the publisher of this report.

This publication is limited in its circulation. This report contains valuable market information provided to a group of customers in response to orders. When ordering this report, the purchasers acknowledge that the report is solely for the internal use of the purchaser's organisation and that the contents of the report are not for disclosure to third parties or for general publication. The Purchaser agrees to indemnify, defend and hold Limatel Limited harmless from and against any claim made by any third party arising from or in any way connected with the use of the Report by the Purchaser.

This report, or any part thereof, may not be copied, lent, sold or given to third parties without the prior written permission of the publisher.

### Photo Credits

Stock Photos, My Taxi Press Brochure, ICOM, Digital Dispatch Systems, Elicom Electronic, Sigtec, HALE, Kienzle Argo, Cabvision/Liquid Digital, Motorola.

### Disclaimer

Whilst all information contained in this publication has been researched and compiled from sources believed to be accurate and reliable at the time of publishing, the facts, estimates and opinions stated are not guaranteed. All information is provided without warranty, and Limatel Limited makes no representation of warranty, either express or implied, as to the accuracy or completeness of any information hereto contained. In particular, it should not be relied upon as the sole source of reference in relation to the subject matter.

Limatel Limited is a limited company registered in Ireland. No liability can be accepted by Limatel Limited, its directors or employees for any loss occasioned to any person or entity acting or failing to act as a result of anything contained in or omitted from the content of this material, or our conclusions as stated. The findings are Limatel's current opinions; they are subject to change without notice. Limatel has no obligation to update or amend the research or to let anyone know if our opinions change materially.

Any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the Law of the Republic Of Ireland.



# How to order a copy of Taxi Technology Europe

## Correspondence & Queries

Potential purchasers can request sample pages of the report, and have their queries answered by emailing [info@limatel.com](mailto:info@limatel.com)

Limatel intends to regularly update and republish this report, in line with changes in the taxicab sector. It also offers consultancy services to the transportation sector. We welcome correspondence and queries from regulators, manufacturers, academics, taxicab organisations and other interested parties concerning any items of interest.

**Limatel Ltd., Lima, Taylors Hill, Galway, Ireland.**  
**Tel: +353 87 240 4399. Email: [info@limatel.com](mailto:info@limatel.com)**

## Terms:

- Reports are dispatched by email once full payment has been received.
- Reports are sold in accordance with the Conditions of Use and Disclaimer provided in this brochure.

## Cost:

- **1-5 User License:** €950 plus Value Added Tax (VAT) where applicable. Allows 1 to 5 employees access to the product.
- **Site License:** € 1,850 plus Value Added Tax (VAT) where applicable. Allows all employees within a given geographical location access to the product
- **Enterprisewide License:** € 2,400 plus Value Added Tax (VAT) where applicable. Allows all employees in all locations of a company access to the product



## Order in one of the following ways:

- **Online:** Order online at [www.limatel.com](http://www.limatel.com)
- **Fax or Post:** Complete the form overleaf and send it to us in any of the following ways:
  - i. Fax this order sheet to +353 91 396330
  - ii. Post this order sheet to Limatel Limited, Lima, Taylors Hill, Galway, Ireland
- **Email:** Email your order to [info@limatel.com](mailto:info@limatel.com) quoting the following:
  - » The country from which you are ordering
  - » The email address to which the report is to be delivered
  - » The name and VAT Registration Number of your business if you wish to avoid the addition of VAT when ordering from within the European Union but outside of Ireland.
  - » Whether you require a Site License or an Enterprise License
  - » Which of the methods listed below you intend to use for payment.

Alternatively, you may wish to scan & email a completed order form.



## Pay in one of the following ways:

- At the time of ordering, request to make payment using Paypal's credit card facility or your PayPal account. We will email you a secure link that allows you to speedily and securely complete your payment transaction.
- By bank draft made payable to Limatel Limited and posted to:  
**Limatel Limited, Lima, Taylors Hill, Galway, Ireland**
- By Direct Bank transfer (referencing your business) to Allied Irish Banks, Lynch's Castle, Galway, Ireland to the following account:  
**Account Name: Limatel Limited**  
**Account Number: 30208-183**  
**National Sort Code: 93-70-96**  
**IBAN: IE07 AIBK 9370 9630 2081 83**  
**BIC: AIBKIE2D**

# Order Form: Taxi Technology Europe Volumes 1 and 2

## Choose License Type

<input type="checkbox"/>	1-5 User License:	€950 plus Value Added Tax (VAT) where applicable
<input type="checkbox"/>	Site License:	€1,850 plus Value Added Tax (VAT) where applicable
<input type="checkbox"/>	Enterprise License:	€2,400 plus Value Added Tax (VAT) where applicable

Forename:	Family Name/Surname:
Position:	Company:
Address:	Country:
	Telephone:
	Date:

Email to which report is to be transmitted:

VAT is chargeable on all orders from the Republic of Ireland. Orders from all other countries in the European Union must also pay Value Added Tax unless they are registered for VAT, and quote their VAT identification number below. Orders from outside of the European Union are not subject to VAT.

VAT identification number:

## Choose Payment Type

- ☐ Please find attached a cheque/draft payable to Limatel Limited
- ☐ Payment is being transmitted via bank transfer (see details on the back of this form)
- ☐ Please email me a secure link to allow payment by Credit Card or PayPal

## Request an Invoice

- ☐ Please supply me with an invoice

Email to which Invoice is to be transmitted:

Purchase Order Number (if you require one to be quoted):

[www.limatel.com](http://www.limatel.com)

Limatel Ltd., Lima, Taylors Hill,  
Galway, Ireland.

tel: +353 87 240 4399

fax: +353 91 396 330

e-mail: [info@limatel.com](mailto:info@limatel.com)