

THIN-FILM INTEGRATED PASSIVE DEVICES 2020

Market & Technology Report - September 2020

5G and 3D integration are pushing the IPD market towards further growth.

WHAT'S NEW

- Covid 19's impact on general market forecasts
- Focus on market trends, IPD growth relays, and market potential

KEY FEATURES

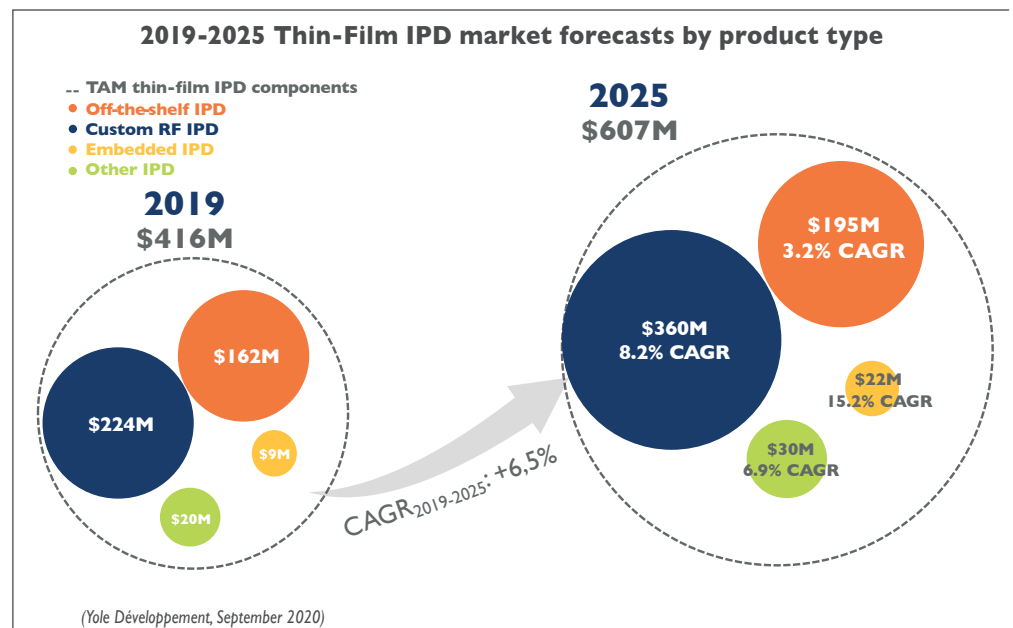
- Thin-film IPD market forecast 2015 - 2025, in Mu and \$M
- Thin-film IPD market trends and future evolution
- Technology trends and main manufacturing techniques

THE IPD MARKET WILL GROW WITH A 2019-2025 6.5% CAGR

Despite offering unique features, thin-film IPD technology shows limited market penetration in the world of passives. However, even a low share in this enormous industry can represent significant results. Over time, thin-film IPD have managed to penetrate a few applications and find growth relays. The main market today, and one that shows strong growth, is the custom RF IPD featured in RF modules, especially for future 5G applications. These are filters for large-frequency bands and lumped-element circuits for impedance matching, for example. This market is expected to see an 8.2% CAGR 2019 - 2025, surpassing \$360M in 2025. The other large-value market is off-the-shelf IPD used for EMI shielding in stringent applications or for basic RF operations like baluns or filtering. This

market will represent \$195M in 2025, with a 3.15% CAGR 2019 - 2025.

After custom RF IPD, today's most active market is embedded decoupling capacitance in application processors, implemented thanks to advanced 3D integration. This is a prospective high indirect-value market. IPD themselves will not represent a huge part of the cost, but their implementation matters in the choice of the foundry service provider, thus becoming a strategic technology for component manufacturers. This market should grow to \$21.7M in 2025, with a 15.2% CAGR 2019 - 2025. The last market of interest is decoupling capacitance for all other purposes (medical, industrial, aeronautics, etc.), which should reach \$30M in 2025 with a 6.9% CAGR 2019 - 2025.



A DIVERSE RANGE OF PLAYERS

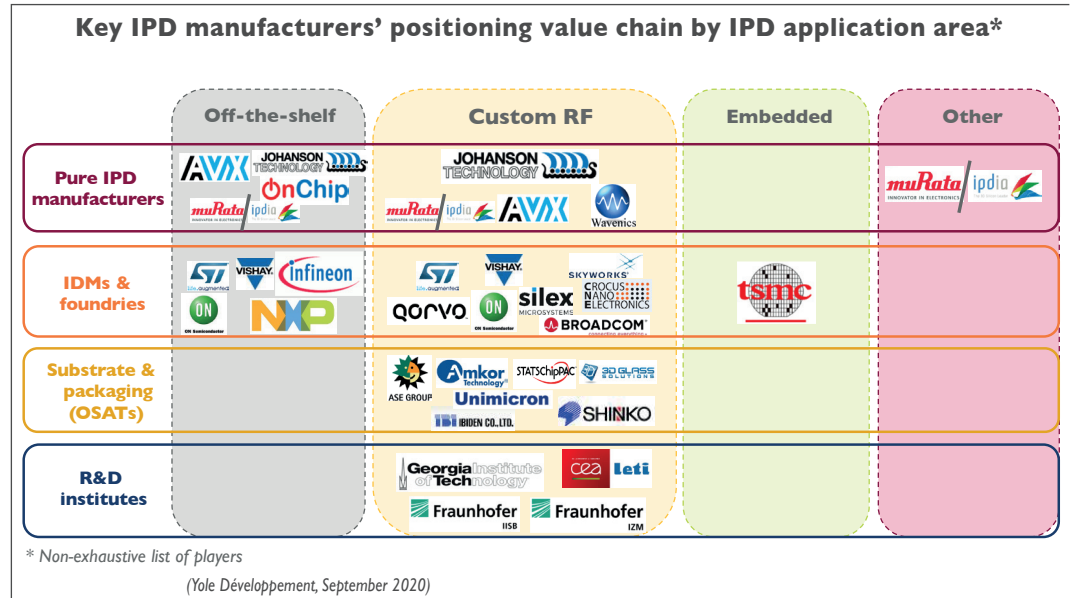
A diverse range of players are active in IPDs. These include start-up companies (3DiS, XPeedIC, IPDia – as a branch of Murata - etc.) developing custom solutions for high-end markets, IDMs (Qorvo, Skyworks, Broadcom) that include IPD in their RF modules, OSATs (ASE, Amkor, etc.), and foundry service providers (TSMC, STMicroelectronics) requested to have this solution in their portfolio. Depending on the player(s), the interest differs as well as the long-term strategy. In general, IPD start-up companies

are small technology companies with an innovative approach that addresses high-end markets, but which are seeking growth and have not managed to find it in their niche. Typically, these companies will either look to diversify their markets and explore consumer opportunities or license their technology to OSATs and foundry service providers.

OSATs and foundries view IPD as a mandatory part of their portfolio, without it being a direct revenue creator. Some specific client demands include IPD, and in some recent cases IPD

have become a strategic piece of technology. This is the case for TSMC and Apple: TSMC managed to master IPD 3D integration for decoupling capacitors, which helped it secure the very lucrative Apple application processor market. Though IPD themselves do not create direct value, their impact can be huge. For IDMs and RF

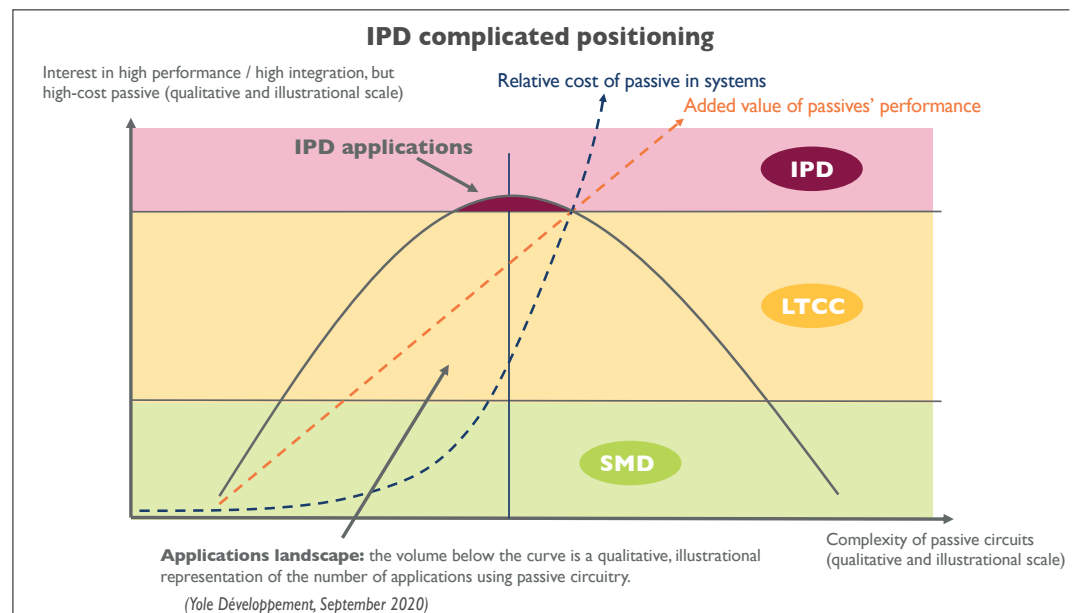
component manufacturers, IPD are considered more of a nice piece of technology for reducing size and increasing performance in some specific cases. IPD are not yet ubiquitous in these companies' developments, but their presence is increasing.



A COMPLEX POSITIONING, BUT ONE WHICH SEES MARKET INTEREST

IPD suffer from LTCC competition, and LTCC themselves deal with low-cost SMD competition. Pragmatically speaking, in any complex system the passives are not the critical part. In fact, passive components have been around since the early days of electronics, and solutions that are small enough, cheap enough, and performant enough exist for almost any application. For large-volume applications in particular, cost is one of the most important criteria, and therefore the cheapest viable solution will always be chosen first. This means that, for high-volume systems, LTCC will be chosen over SMD

only if no other option exists, and likewise IPD will be chosen over LTCC only if mandatory. This leaves IPD as a "last resort" solution when performance is critical enough. For low-volume, high-performance solutions, the issue with IPD positioning is different and the problem lies on the manufacturer's side. Even if expensive, IPD stay in absolute low-cost components, and a minimum revenue is asked from IPD manufacturers before custom-creating an IPD solution. This infers that many applications cannot feature IPD, since they are not attractive enough for product development.



In this complex context of either being the “last resort” solution for volume products or being an unattractive opportunity for low-volume solutions, IPD still manage to find their specific applications. These are often moving targets allowing for continuous growth of the IPD market. Today this application is RF components for 5G, and tomorrow it should be decoupling capacitance, together with datacom

and telecom applications, that will drive volumes and revenue. No market disruption is expected, and growth will be progressive with new growth relays over time. IPD are not enabling technologies for high-volume applications, and a single-digit CAGR will exist for the total market, but it will remain a growing market opportunity in the long term.

REPORT OBJECTIVES

For over two decades IPD has been a technology with considerable promise, just waiting for mass implementation. Yole has scrutinized this technology over the past eight years to assess its penetration and potential evolution. Our last IPD report dates to 2017 and includes an extensive technical analysis of the technology. In this 2020 report we undertake a more thorough assessment of the market’s potential and the status of IPD technologies. We also explore the different addressed markets and accessible markets, as well as IPD’s positioning as a promising technology still awaiting mass adoption.

COMPANIES CITED IN THE REPORT (non exhaustive list)

Active Semi, Airoha, Akoustis, Apple, ASE, Asus, AT&T, AvinIC, Broadcom, CanaanTek, Cavendish Kinetics, China Mobile, China Telecom, China Unicom, CoolPad, Cypress Semiconductor, DB-HiTek, EE, Elisa, Ericsson, Etisalat, GlobalFoundries, Global Wafer, Google, HH Grace, HiSilicon, HMD Global, HTC, Huawei, Huntersun, Infineon, Intel, IQE, Jio, JRC, KDDI, KT, Kyocera, Lansus, Lenovo, LG, LG U+, Maxscend, MediaTek, Meizu, Murata, NationZ, Nokia, NSI, NTT Docomo, NXP, ON Semiconductor, OnePlus, Onmicro, Oppo, Orange, pSemi, Qorvo, Qualcomm, RDA, Resonant, Richwave, RoFS, Samsung, Samsung Electro Mechanical, SAWNICS, Shin-Etsu, Shoulder, SK Telecom, Skyworks, Smarter Micro, SMIC, SoftBank, Soitec, Sony, Sprint, STMicroelectronics, Sumitomo, Sunrise, Swisscom, Taiyo Yuden, TCL, TDK EPCOS, Telefonica, Telia, Telstra, TIM, T-Mobile, Toshiba, Tower Semi, Tpsco, TSMC, UMC, Unisoc, USI, Vanchip, Verizon, Vivo, Vodafone, WillSemi, WIN Semiconductors, WIPAM, Wisol, Xfab, Xiaomi, Xpedic, Yuzhen IC, ZTE and more.

TABLE OF CONTENTS (complete content on i-Micronews.com)

Table of contents	3	> Other RF IPD	
Report scope	4	> General trend	
Report methodology	6	Market share and supply chain	68
What we got right, what we got wrong	9	> Key players and manufacturers per region	
Executive summary	10	> Key players per application and technology type	
Market forecasts	30	> Ecosystem analysis, business models, players’ strategy, supply chain analysis	
> Methodology		Technology trends	75
> Total market forecasts		> Innovation in IPD	
> Market trends		> Technologies comparison	
> Wafer starts, units, revenue (by market, applications, devices)		> Technologies comparison	
Market trends	41	> Overview of key components	
> Definitions		Outlook	III
> Applications and technologies		> Conclusions / incl. 2 – 3-page takeaway	
> EMI & off-the-shelf RF IPD		> What is coming next? What could happen?	
> Custom RF IPD		> Key parameters to look at? Metrics?	
> Embedded RF IPD		> Other sub-title	

RELATED REPORTS, MONITORS & TRACKS



- 5G’s Impact on RF Front-End and Connectivity for Cellphones 2020
- RF Integrated Passive Devices: Reverse Costing Overview
- Silicon Capacitor Technology and Cost Review

More information and details about our offers and bundles opportunities on www.i-micronews.com



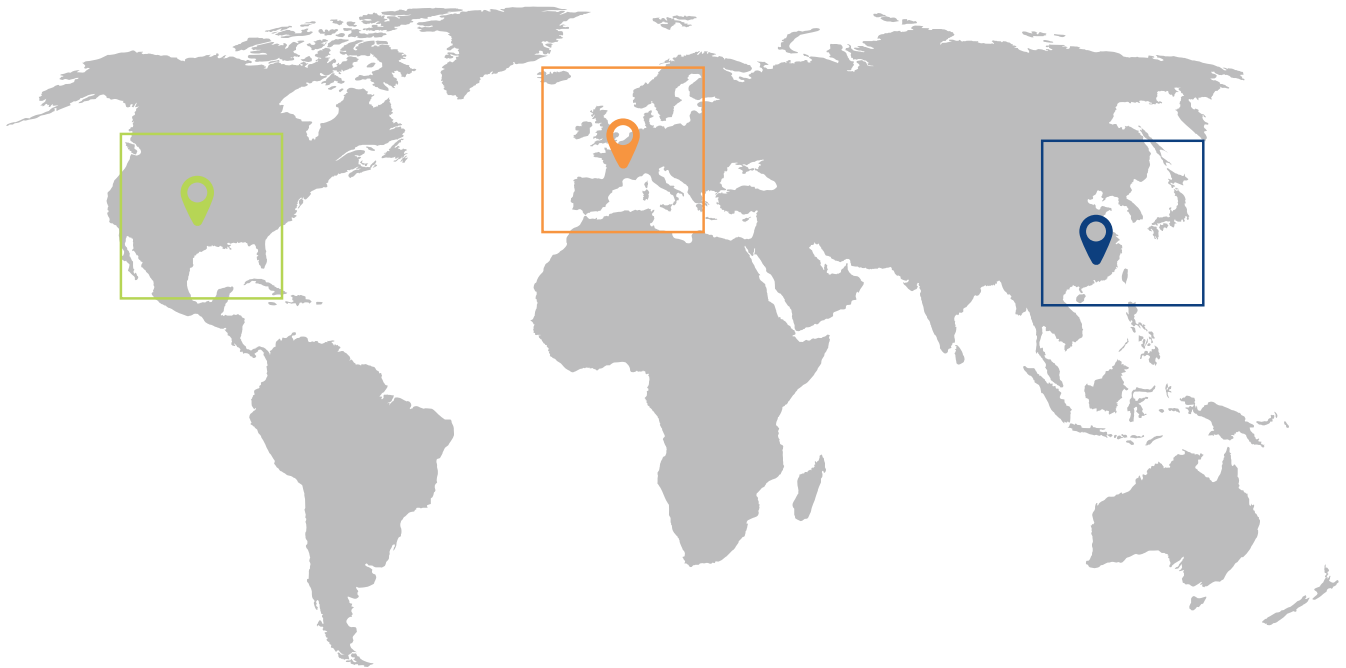
AUTHORS

Antoine Bonnabel works as a Technology & Market Analyst for the Power & Wireless team of Yole Développement (Yole). He carries out technical, marketing and strategic analyses focused on RF devices, related technologies and markets. Prior to Yole, Antoine was R&D Program Manager for DelfMEMS (FR), a company specializing in RF switches and supervised Intellectual Property and Business Intelligence activities of this company. In addition, he also has co-authored several market reports and is co-inventor of three patents in RF MEMS design. Antoine holds a M.Sc. in Microelectronics from Grenoble Institute of Technologies (France) and a M.Sc. in Management from Grenoble Graduate School of Business (France).



As a Technology & Market Analyst, specialized in RF devices & technologies within the Power & Wireless division at Yole Développement (Yole), **Cédric Malaquin** is involved in the development of technology & market reports as well as the production of custom consulting projects. Prior his mission at Yole, Cédric first served Soitec as a process integration engineer during 9 years, then as an electrical characterization engineer during 6 years. He deeply contributed to FDSOI and RFSOI products characterization. He has also authored or co-authored three patents and five international publications in the semiconductor field. Cédric graduated from Polytech Lille in France with an engineering degree in microelectronics and material sciences.

CONTACT



Western US & Canada

Steve Laferriere - steve.laferriere@yole.fr
+1 310 600-8267

Eastern US & Canada

Chris Youman – chris.youman@yole.fr
+1 919 607 9839

Europe and RoW

Lizzie Levenez – lizzie.levenez@yole.fr
+49 15 123 544 182

Benelux, UK & Spain

Marine Wybraniez - marine.wybraniez@yole.fr
+49 69 96 21 76 78

India and RoA

Takashi Onozawa – takashi.onozawa@yole.fr
+81-80-4371-4887

Korea

Peter Ok - peter.ok@yole.fr
+82 1040890233

Japan

Miho Ohtake – miho.ohtake@yole.fr
+81 34405-9204

Toru Hosaka – toru.hosaka@yole.fr
+81 90 1775 3866

Japan and Singapore

Itsuyo Oshiba – itsuyo.oshiba@yole.fr
+81-80-3577-3042

Greater China

Mavis Wang – mavis.wang@yole.fr
+886 979336809 +86 136 61566824

Sales Coordination & Customers Service

David Jourdan – david.jourdan@yole.fr
+33 472 83 01 90

Fayçal El Khamassi – faycal.khamassi@yole.fr
+33 472 83 01 95

ABOUT YOLE DEVELOPPEMENT

Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services. With a strong focus on emerging applications using silicon and/or micro manufacturing, the Yole group of companies has expanded to include more than 120 collaborators worldwide covering MEMS and Image Sensors, Compound Semiconductors, RF Electronics, Solid-state Lighting, Displays, Software, Optoelectronics, Microfluidics & Medical, Advanced Packaging, Manufacturing, Power Electronics, Batteries & Energy Management and Memory.

The “More than Moore” market research, technology and strategy consulting company Yole Développement, along with its partners System Plus Consulting, PISEO and Blumorpho, supports industrial companies, investors and R&D organizations worldwide to help them understand markets and follow technology trends to grow their business.

CONSULTING AND ANALYSIS

- Market data & research, marketing analysis
- Technology analysis
- Strategy consulting
- Reverse engineering & costing
- Design and characterization of innovative optical systems
- Financial services (due diligence, M&A)

More information on www.yole.fr

MEDIA & EVENTS

- i-Micronews.com website, application & related e-newsletter
- Communication & webcast services
- Events: TechDays, forums...

More information on www.i-Micronews.com

REPORTS & MONITORS

- Market & technology reports
- Market and reverse technology quarterly monitors
- Structure, process and cost analysis and teardowns
- Cost simulation tool

More information on www.i-micronews.com/reports

CONTACTS

For more information about :

- Consulting & Financial Services: Jean-Christophe Eloy (eloy@yole.fr)
- Reports & Monitors: David Jourdan (david.jourdan@yole.fr) & Fayçal Khamassi (faycal.khamassi@yole.fr)
- Marketing & Communication: Camille Veyrier (camille.veyrier@yole.fr)
- Public Relations: Sandrine Leroy (sandrine.leroy@yole.fr)

Definitions: **“Acceptance”**: Action by which the Buyer accepts these General Terms and Conditions of Sale in their entirety. It is done by signing the purchase order which states “I hereby accept Yole Développement’s General Terms and Conditions of Sale”.

“Buyer”: Any business user (i.e. any person acting in the course of its business activities for its business needs) placing an order pursuant to these General Terms and Conditions of Sale, with the exclusion of any individual consumer acting for his/her sole personal interest.

“Seller”: Headquartered in Villeurbanne (France), Yole Développement provides marketing, technology and strategy consulting, media and corporate finance services, reverse engineering/costing services as well as IP and patent analysis. With dedicated teams of technology & market analysts, Yole Développement operates worldwide with the key industrial companies, R&D institutes and investors to help them understand the market and technology trends.

“Contracting Parties” or **“Parties”**: The Seller on the one hand and the Buyer on the other hand.

“Intellectual Property Rights” (“IPR”) means any rights held by the Seller in its Products, including any patents, trademarks, registered models, designs, copyrights, inventions, commercial secrets and know-how, technical information, company or trading names and any other intellectual property rights or similar in any part of the world, notwithstanding the fact that they have been registered or not and including any pending registration of one of the above mentioned rights.

“Products”

Our products can be bought either on a unit basis or as a bundled offer (i.e. subscription for a period of 12 calendar months).

“Report”

Reports are established in PowerPoint and delivered in a PDF format with an additional Excel file. 30 min of Q&A session with an analyst/author can be included for all purchased reports (except the ones bought as a one user license). More time can be allocated on a fee basis.

“Monitor”

Monitors are established and delivered in Excel. An additional PDF can also be added. Q&A with an Analyst is possible for each monitor (except where specified otherwise). Frequency of the release vary according to the monitor or service (quarterly and monthly). All monitor products are eligible for a Corporate License.

“Tracks”

Yearly subscription to access a web-based interactive portal to view features and specs of a device or component based on a complete turnaround process.

“License”

For the reports 3 different licenses are proposed. Buyer has to choose one license type:

- One User License: The report is intended for only one identified user at the Company purchasing the report - Sharing is strictly forbidden
- Multi-User License: The report can be shared by an identified user at the Company purchasing the report with an unlimited number of employees of said Company, working in the country where the identified user is based. No rights are granted to any employees of any Subsidiaries or Joint Ventures of the Company.
- Corporate License: The report or monitor can be shared by an identified user of the Company purchasing the report with an unlimited number of employees of said Company on a global basis. Subsidiaries controlled by the Company are included, however Joint Ventures involving the Company are excluded.

DISCLAIMER: Notwithstanding the fact that certain persons within an organisation may be entitled to access a report pursuant to a Multi-User or a Corporate License, Yole Développement shall in no event incur any liability in any form whatsoever, if Yole Développement should sell one or more licenses directly to any such persons.

1. SCOPE

1.1 Both Contracting Parties undertake to comply with these General Terms and Conditions of Sale.
ANY ADDITIONAL, DIFFERENT, OR CONFLICTING TERMS AND CONDITIONS IN ANY OTHER DOCUMENTS ISSUED BY THE BUYER AT ANY TIME ARE HEREBY OBJECTED TO BY THE SELLER, ARE DEEMED WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER, AND SHALL NOT BE BINDING IN ANY WAY ON THE SELLER.

1.2 These General Terms and Conditions of Sale shall be deemed valid and enforceable between the Contracting Parties after acceptance of an order from the Buyer by the Seller pursuant to Article 1.3 below. For such purpose, the Buyer, when signing the purchase order which mentions “I hereby accept Yole Développement’s Terms and Conditions of Sale” is deemed to have fully and unequivocally accepted these Terms and Conditions of Sale.

1.3 Orders are deemed to be accepted only upon written acceptance and confirmation by the Seller, within [7 days] from the date of order, to be sent either by email. In the absence of any confirmation in writing, no order shall be deemed to have been accepted.

2. MAILING OF THE PRODUCTS

- 2.1 Products are sent by email to the Buyer after Seller’s confirmation:
 - Within a few days from the Seller’s confirmation of the order for Products already released and paid; or
 - Within a reasonable time for Products ordered prior to their effective release. In this case, the Seller shall use its best endeavours to inform the Buyer of an indicative release date and the evolution of the work in progress.
- 2.2 The Seller shall by no means be responsible for any delay pursuant to Article 2.1 above, in particular in cases where a new event or access to new contradictory information would require the Seller analyst to dedicate extra time to compute or compare the data in order to enable the Seller to deliver a high quality Product.
- 2.3 The mailing of the Product will occur only upon payment by the Buyer, in accordance with the conditions contained in Article 3 above.

2.4. The mailing is operated through electronic means either by email via the sales department or automatically online via an email/password. The Buyer is responsible for ensuring that the Buyers platform has the required capacities and authorisations to receive the Product(s) emailed by the Seller. If the Product’s electronic delivery format is defective, the Seller undertakes to replace it at no charge to the Buyer provided that the Seller is informed of the defective formatting within 90 days from the date of the original download or receipt of the Product.

2.5 The person receiving the Products on behalf of the Buyer shall immediately verify the quality of the Products and their conformity with the order. Any claim for apparent defects or for non-conformity shall be sent in writing to the Seller within 8 days of receipt of the Products. For this purpose, the Buyer agrees to produce sufficient evidence of such defects.

2.6 No return of Products shall be accepted without prior written notification from the Buyer to the Seller, even in case of delayed delivery. Any Product returned to the Seller without the Buyer providing prior notification to the Seller as required under Article 2.5 above shall remain at the Buyer’s risk. In no event shall the Seller incur any liability for Products erroneously ordered by the Buyer, or for any request from the Buyer to replace a Product previously ordered by a different Product.

3. PRICE, INVOICING AND PAYMENT

3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to annual subscriptions. They are deemed to be inclusive of all taxes applicable in the country where the Seller is based (except for France where VAT will be added). The prices are re-evaluated from time to time by the Seller. The effective price is deemed to be the one applicable at the time of the order.

3.2 Payments due by the Buyer shall be sent by cheque payable to Yole Développement, or made by credit card or by electronic transfer to the following account:
 HSBC, 1 place de la Bourse 69002 Lyon France
 Bank code: 30056
 Branch code: 00170
 Account n°: 0170 200 1565 87
 BIC or SWIFT code: CCFRFRPP
 IBAN: FR76 3005 6001 7001 7020 0156 587

To secure the payments due to the Seller, the Seller reserves the right to request down payments from the Buyer. In such case, the need for a down payment will be mentioned on the corresponding order.

3.3 Payment is due by the Buyer to the Seller within 30 days from invoice date, except as otherwise specifically agreed in writing by the Buyer and the Seller. If the Buyer fails to pay at the due date and fails to request and obtain from the Seller a payment extension, the latter shall be entitled to invoice interest in arrears based on the annual rate Refi of the “BCE” + 7 points, in accordance with article L.441-6 of the French Commercial Code.

3.4 The Seller publications (reports, monitors, tracks...) are due for delivery only after receipt by the Seller of any payment due by the Buyer prior to delivery.

3.5 In the event of termination of the contract by the Seller attributable to Buyer misconduct during the contract, the Seller will have the right to invoice all work performed at the time of termination, and to take legal action for damages.

4. LIABILITIES

4.1 The Buyer or any other individual or legal person acting on its behalf, being a business user buying the Products for its business activities, shall be solely responsible for the choice of the Products purchased as well as for the use and interpretations the Buyer makes of the documents it purchases, of the results the Buyer obtains, and of the advice and acts the Buyer bases thereon .

4.2 In no event shall the Seller be liable for:

- a) Damages of any kind, including without limitation, incidental or consequential damages (including, but not limited to, damages for loss of profits, business interruption and loss of programs or information) arising out of the use of a Product or the use of or the inability by the Buyer to use the Seller’s website, or any information provided on the website, or contained in a Product;
- b) Any claim attributable to errors, omissions or other inaccuracies in a Product or interpretations thereof.

4.3 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.4 Any Product that the Seller sells may, upon prior notice to the Buyer from time to time be modified by Seller or substituted with a similar Product meeting the needs of the Buyer. Such modification shall not lead to any liability of the Seller, provided that the Seller ensures the substituted Product is similar to the Product initially ordered.

4.5 In the case where, after inspection, it is acknowledged that a Product contain defects, the Seller undertakes to replace the defective product to the extent reasonably feasible and without indemnification or compensation of any kind for labour costs, delays, loss caused or any other reason being due by the Buyer . This undertaking from the Seller shall be effective for a maximum of two months starting from the delivery date but shall not be applicable in the event of force majeure as described in Article 5 below.

4.6 The deadlines that the Seller is asked to provide for the mailing of a Product are given for information purposes only and are not guaranteed. If such deadlines are not met, this shall not, without the agreement of the Seller lead to any claim for damages or right of cancellation of one or more orders by the Buyer, except for non-acceptable delays exceeding [3] months from the stated deadline. In such case only i.e. only in the event of a delay exceeding (3) months from the stated deadline the Buyer shall be entitled to ask for a reimbursement of any down payment previously made to the Seller, to the exclusion of any other damages.

4.7 The Seller does not make any warranties, express or implied, including, without limitation, those of sale ability and fitness for a particular purpose, with respect to any Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms, Trojan horses or other codes containing contaminating or destructive properties before making Products available, the Seller cannot guarantee that any Product will be free from infection.

5. FORCE MAJEURE

The Seller shall not be liable for any delay in performance directly or indirectly caused by or resulting from acts of nature, fire, flood, accident, riot, war, government intervention, embargoes, strikes, labour difficulties, epidemics, major health event (e.g. Corona virus), equipment failure, late deliveries by suppliers or other difficulties which are beyond the control, and not attributable to the fault of the Seller.

6. PROTECTION OF THE SELLER’S IPR

6.1 All the IPR attached to the Products are and remain the property of the Seller and are protected under French and international copyright law and conventions.

6.2 The Buyer agreed not to disclose, copy, reproduce, redistribute, resell or publish a Product, or any part of it to any other party other than employees of the Buyer Company (and only in the country of the Primary User for Multi-User Licenses). The Buyer shall have the right to use Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use any Product for purposes such as:

- Information storage and retrieval systems;
- Recordings and re-transmittals over any network (including any local area network);
- Use in any timesharing, service bureau, bulletin board or similar arrangement or public display;
- Posting any Product to any other online service (including bulletin boards or the Internet);
- Licensing, leasing, selling, offering for sale or assigning a Product or any derivative thereof.

6.3 If the Buyer would like to use data coming from a Product for presentations, press announcements and any other projects, the Buyer needs to contact Yole Développement’s Public Relations Director (info@yole.fr) to get an official authorization and confirm that the data are up to date. In return the Seller will make sure to provide up-to-date data under a suitable public format.

6.4 The Buyer shall be solely responsible towards the Seller for any infringement of the obligation described in Article 6.3 above, whether such infringement originates from the Buyer’s employees or any person to whom the Buyer has sent the Products. Furthermore, the Buyer shall initiate and personally take care of any related proceedings in coordination with the Seller, and the Buyer shall bear the related financial consequences in their entirety.

6.5 The Buyer shall define within its Company an identified user who shall serve as a contact person for the License purchased by the Buyer. This person will be the recipient of each new report. This person shall also be responsible on behalf of the Buyer, for compliance with all copyrights and other obligations relating to the protection of the Seller’s IP rights and general compliance with the terms of the License purchased by the Company. In the context of Bundle and Annual Subscriptions, the contact person shall decide within the Buyer which person(s) shall be entitled to receive the protected link that will allow the Buyer to access the Products.

6.6 It is acknowledged and accepted by the Buyer that whether purchased in the form of Bundles or Annual Subscription, all unselected reports will be deemed cancelled and lost after a period of 12 month following acceptance of the corresponding order by the Seller in accordance with provisions of Article 1.3 above .

6.7 It is further acknowledged and agreed by the Buyer that any investor in the Buyer Company, any external consultant of the Buyer Company or any joint venture done with a third party in which the Buyer Company is involved , is not entitled to use a Product, without paying to the Seller the full price for a license to the required Product..

7. TERMINATION

If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that may be incurred by the Seller, pursuant to such cancellation or postponement.

8. MISCELLANEOUS

8.1 All the provisions of these General Terms and Conditions of Sale are for the benefit of the Seller, but also for that of its licensors, resellers and agents. Each of them is entitled to assert and enforce these provisions against the Buyer.

Any notices under these Terms and Conditions shall be given in writing and shall be effective upon receipt by the other Party.

8.2 The Seller may, from time to time, update these General Terms and Conditions of Sale, and the Buyer, shall be deemed to have accepted the latest version of such General Terms and Conditions of Sale, once they have been duly communicated to the Buyer by the Seller.

9. GOVERNING LAW AND JURISDICTION

- 9.1 Any dispute arising out or linked to these General Terms and Conditions of Sale or to any Licenses or Products purchased in application thereof shall be submitted to the French Commercial Court of Lyon, which shall have exclusive jurisdiction upon such issues.
- 9.2 French law (without reference to any applicable conflict of law provisions) shall apply to these General Terms and Conditions of sale and any agreement between the Buyer and the Seller made pursuant thereto.