Camera Module Comparison 2019
Physical Analysis & Cost Comparison
Imaging report by Audrey LAHRACH
January 2019 – version 1
## Table of Contents

### Overview / Introduction 5
- Executive Summary
- Reverse Costing Methodology

### Physical Analysis 11
- Summary of the Physical Analysis
- Consumer smartphones
  - Rear-Facing
    - Dual
      - Apple iPhone X/Xs Max/XR
      - Samsung Galaxy S9
      - Oppo Find X
      - Xiaomi Mi8 Explorer
      - Vivo X21UD
    - 3D
      - Huawei P20 Pro
      - Huawei Mate 20 Pro
  - Front-Facing
    - Standard
      - Huawei P20 Pro
      - Vivo X21UD
    - Dual
      - iPhone X/Xs Max/XR
      - Samsung Galaxy S9
      - Huawei Mate 20 Pro
      - Xiaomi Mi8 Explorer
      - Oppo Find X

### Physical Evolution 240
- Apple
- Samsung
- Huawei
- Xiaomi

### Physical Comparison 275

### Cost Analysis 290

### Comparison Cost 295

### Feedbacks 300

### SystemPlus Consulting services 302
Executive Summary

Accompanying Yole Development’s CCM Applications 2019 Market report, we have conducted this comparative study to provide insight on the structure and the technology of 28 CCMs extracted from seven flagship smartphones from several major brands: the Apple iPhone X, Samsung Galaxy S9, Huawei P20 Pro, Huawei Mate 20 Pro, Xiaomi Mi8, Oppo Find X and Vivo X21UD.

Four years ago, only two cameras on average could be found in smartphone. Today this number has risen to four in order to add other features such as face recognition, with infrared camera modules, in the front camera or to improve the zoom in the rear camera.

We analyze rear and front-facing CCMs including standard mono modules, dual modules, iris scanners, 3D camera modules and triple modules. We also compare them in terms of structure overview, module integration, lens numbers and dimensions, CMOS Image Sensor resolution, pixel size and other parameters. Additionally, we have studied the costs of these camera modules to compare the economic choices of the manufacturers. We present a historical comparative review in the report for four players, Apple, Samsung, Huawei and Xiaomi, in order to show the evolution of their technological choices.
## Rear Facing

### Dual Camera
- iPhone X, XS Max
- Samsung Galaxy S9
- Oppo Find X
- Xiaomi Mi8
- Vivo X21UD

### Tri Camera
- Huawei P20 Pro
- Mate 20 Pro

## Front Facing

### Physical Evolution

### Physical Comparison

### Cost Analysis

### Cost Comparison

### Related Reports

### About System Plus
Apple iPhone X, XS Max & XR

Physical Analysis (Consumer)
- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
      - Samsung galaxy S9
      - Oppo Find X
      - Xiaomi Mi8
      - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro
- Front Facing

Physical Evolution

Physical Comparison

Cost Analysis

Cost Comparison

Related Reports

About System Plus
### iPhone X Specs (from DeviceSpecifications)

#### Primary Camera

The primary camera of the mobile device is usually placed at its back and is used for taking photos and recording videos.

<table>
<thead>
<tr>
<th>Sensor model</th>
<th>Sony Exmor RS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensor type</td>
<td>CMOS (complementary metal-oxide semiconductor)</td>
</tr>
<tr>
<td>Aperture</td>
<td>f/1.8</td>
</tr>
<tr>
<td>Focal length</td>
<td>≈ 3.99 mm (millimeters)</td>
</tr>
<tr>
<td>Image resolution</td>
<td>4032 x 3024 pixels 12.19 MP (megapixels)</td>
</tr>
<tr>
<td>Video resolution</td>
<td>3840 x 2160 pixels 8.29 MP (megapixels)</td>
</tr>
</tbody>
</table>

#### Video FPS

Information about the maximum number of frames per second (fps), supported by the device while recording a video at a maximum resolution. Some of the main standard frame rates for recording and playing video are 24p, 30p, 60p.

- 60 fps (frames per second)

#### Features

- Autofocus
- Continuous shooting
- Digital zoom
- Optical image stabilization
- Geotagging
- Panorama
- HDR
- Touch focus
- Face detection
- White balance settings
- ISO settings
- Exposure compensation
- Self-timer
- Scene mode
- Macro mode
- RAW

#### Rear Facing

- iPhone X, XS Max
- Samsung Galaxy S9
- Oppo Find X
- Xiaomi Mi8
- Vivo X21UD
- Huawei P20 Pro
- Mate 20 Pro

#### Tri Camera

- Huawei P20 Pro
- Mate 20 Pro

#### Front Facing

- iPhone X Specs (from DeviceSpecifications)
Camera Module with Flex

Overview / Introduction / Market

Physical Analysis (Consumer)
- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
    - Samsung galaxy S9
    - Oppo Find X
    - Xiaomi Mi8
    - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro
- Front Facing

Physical Evolution

Physical Comparison

Cost Analysis

Cost Comparison

Related Reports

About System Plus

©2019 by System Plus Consulting
Camera Module Cross-Section - Overview

Physical Analysis (Consumer)

- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
    - Samsung galaxy S9
    - Oppo Find X
    - Xiaomi Mi8
    - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro

- Front Facing

Related Reports

About System Plus
Camera Module 1

Overview / Introduction / Market

Physical Analysis (Consumer)
- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
      - Samsung galaxy S9
      - Oppo Find X
      - Xiaomi Mi8
      - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro
- Front Facing

Physical Evolution
Physical Comparison
Cost Analysis
Cost Comparison
Related Reports
About System Plus

©2019 by System Plus Consulting | Mobile Camera Module Comparison 2019
Camera Module #1 Dimensions

Physical Analysis (Consumer)
- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
    - Samsung galaxy S9
    - Oppo Find X
    - Xiaomi Mi8
    - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro
- Front Facing

Physical Evolution

Physical Comparison

Cost Analysis

Cost Comparison

Related Reports

About System Plus
Camera Module #1 Teardown

Physical Analysis (Consumer)
- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
    - Samsung Galaxy S9
    - Oppo Find X
    - Xiaomi Mi8
    - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro
- Front Facing

Physical Evolution

Physical Comparison

Cost Analysis

Cost Comparison

Related Reports

About System Plus
Camera Module Teardown – CIS Die #1

Die Area: $xx \text{mm}^2$
(xx x xxmm)

Nb of PGDW per 12-inch wafer: xxxx

Pad number: xxx

Pixel array: $xx \text{mm}^2$
(xx x xxmm)

CIS resolution: 4250x3030 (12.9Mp)

- Pixel area: $xx \mu\text{m}^2$
- Pixel size: $xx \mu\text{m}$

CIS Die Overview
©2019 by System Plus Consulting
Camera Module Cross-Section – Module #1

Physical Analysis (Consumer)
- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
    - Samsung galaxy S9
    - Oppo Find X
    - Xiaomi Mi8
    - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro
- Front Facing

Physical Evolution

Physical Comparison

Cost Analysis

Cost Comparison

Related Reports

About System Plus
Camera Module Cross-Section – Module #1

Physical Analysis (Consumer)
- Rear Facing
  - Dual Camera
    - iPhone X, XS Max
    - Samsung galaxy S9
    - Oppo Find X
    - Xiaomi Mi8
    - Vivo X21UD
  - Tri Camera
    - Huawei P20 Pro
    - Mate 20 Pro
- Front Facing

Physical Evolution

Physical Comparison

Cost Analysis

Cost Comparison

Related Reports

About System Plus
Camera Module Cross-Section – Module #1
Overview / Introduction / Market
Physical Analysis (Consumer)
Physical Evolution
Physical Comparison
Cost Analysis
Cost Comparison
Related Reports
About System Plus
## Huawei Comparison – Package

### Package Dimensions

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Package Dimensions without Flex</th>
<th>Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>P9</td>
<td></td>
<td>2 x 12</td>
</tr>
<tr>
<td>P10</td>
<td></td>
<td>2 x 17</td>
</tr>
<tr>
<td>P20 Pro</td>
<td></td>
<td>2 x 12</td>
</tr>
<tr>
<td>Mate 20 Pro</td>
<td></td>
<td>2 x 12</td>
</tr>
<tr>
<td>Mate 20 Pro (NIR Camera)</td>
<td></td>
<td>2 x 12</td>
</tr>
</tbody>
</table>

---

**Huawei P9 – Front Camera** ©2018 by System Plus Consulting

**Huawei P10 – Front Camera** ©2018 by System Plus Consulting

**Huawei P20 Pro – Front Camera** ©2018 by System Plus Consulting

**Huawei Mate 20 Pro – Front Camera** ©2018 by System Plus Consulting

**Huawei Mate 20 Pro – NIR Camera** ©2018 by System Plus Consulting
## Huawei Comparison – Sensor Die

### Table: Sensor Die Area Comparison

<table>
<thead>
<tr>
<th>Ref.</th>
<th>CIS Die Area</th>
<th>Pixel array</th>
<th>PGDW</th>
<th>Pad number</th>
<th>Pixel Size</th>
<th>CIS resolution (Mp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P9</td>
<td>23.25 × 23.25</td>
<td>12.0 × 12.0</td>
<td>1.0</td>
<td>600</td>
<td>1.79, 1.99</td>
<td>12.0 × 12.0</td>
</tr>
<tr>
<td>P10</td>
<td>23.25 × 23.25</td>
<td>12.0 × 12.0</td>
<td>1.0</td>
<td>600</td>
<td>1.79, 1.99</td>
<td>12.0 × 12.0</td>
</tr>
<tr>
<td>P20 Pro</td>
<td>23.25 × 23.25</td>
<td>12.0 × 12.0</td>
<td>1.0</td>
<td>600</td>
<td>1.79, 1.99</td>
<td>12.0 × 12.0</td>
</tr>
<tr>
<td>Mate 20 Pro</td>
<td>23.25 × 23.25</td>
<td>12.0 × 12.0</td>
<td>1.0</td>
<td>600</td>
<td>1.79, 1.99</td>
<td>12.0 × 12.0</td>
</tr>
</tbody>
</table>

### Diagrams:

- Huawei P9 – Front Camera
- Huawei P10 – Front Camera
- Huawei P20 Pro – Front Camera
- Huawei Mate 20 Pro – Front Camera
- Huawei Mate 20 Pro – NIR Camera
Huawei Comparison – Cross-Section

<table>
<thead>
<tr>
<th>Ref.</th>
<th>OIS / AF</th>
<th>Lens Number</th>
<th>Substrate type</th>
<th>Filter substrate Material</th>
<th>Lens Diameter Average</th>
<th>Connector Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>P9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P10</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P20 Pro</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mate 20 Pro</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mate 20 Pro (NIR Camera)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Camera Module Front - Dual

<table>
<thead>
<tr>
<th>Camera Module</th>
<th>iPhone X</th>
<th>iPhone X</th>
<th>Galaxy S9</th>
<th>Galaxy S9</th>
<th>Mate 20 Pro</th>
<th>Mate 20 Pro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens Module Price</td>
<td>Cost</td>
<td>Breakdown</td>
<td>Cost</td>
<td>Breakdown</td>
<td>Cost</td>
<td>Breakdown</td>
</tr>
<tr>
<td>Autofocus Actuator/OIS Price</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS Die Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Assembly &amp; Test Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Camera Module</th>
<th>Xiaomi Mi8</th>
<th>Xiaomi Mi8</th>
<th>Oppo Find X</th>
<th>Oppo Find X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lens Module Price</td>
<td>Cost</td>
<td>Breakdown</td>
<td>Cost</td>
<td>Breakdown</td>
</tr>
<tr>
<td>Autofocus Actuator/OIS Price</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIS Die Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Assembly &amp; Test Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

©2019 by System Plus Consulting | Mobile Camera Module Comparison 2019
CMOS Camera Modules (CCM) have become a key sensor technology – what are the dynamics and strategies in this highly competitive market?

**KEY FEATURES OF THE REPORT**
- Updated forecasts
- Ecosystem analysis
- Technology update
- New trends and applications
- Special focus on Wafer Level Optics

Bundle offer possible with the Camera Module Comparison 2018 report by System Plus Consulting, contact us for more information.
Related Reports

REVERSE COSTING ANALYSES - SYSTEM PLUS CONSULTING

IMAGING
- Mantis Vision’s 3D Depth Sensing System in the Xiaomi Mi8 Explorer Edition
- Orbbec’s Front 3D Depth Sensing System in the Oppo Find X
- STMicroelectronics’ Near Infrared Camera Sensor in the Apple iPhone X
- Sony IMX400 Tri-layer Stacked CMOS Image Sensor (CIS) with Integrated DRAM and DSP

MARKET AND TECHNOLOGY REPORTS - YOLE DÉVELOPPEMENT

IMAGING
- Status of the CMOS Image Sensor Industry 2018
- 3D Imaging & Sensing 2018
Mobile Camera Module Comparison 2019

Analysis and comparison of 28 different visible and infrared cameras in the Apple iPhone X/XS/XR, Samsung Galaxy S9, Huawei Mate 20 Pro and P20 Pro, Xiaomi Mi8 Explorer Edition, Oppo Find X and Vivo X21UD.

With a Compound Annual Growth Rate of 12% between 2017 and 2023, the mobile camera module semiconductor market is one of the most dynamic in the smartphone space. The $9 billion revenue of the CMOS Camera Module (CCM) industry in 2017 was shared between several companies, including LG Innotek, Samsung Electro-Mechanics and Sunny Optical Technology.

The CCM market has seen several innovations this year. The first is the multiple camera approach, seen on all seven of the models we study in this report. The average is around four cameras per smartphone. The second innovation is the generalization of Optical Image Stabilization (OIS) on the rear CCM. Thirdly, four out of seven smartphones have 3D cameras for face recognition.

This overview will tell you the main OEMs’ choices, and reveal the state of the art of camera modules for leading flagships in 2018.

We have conducted this comparative study to provide insight on the structure and the technology of 28 CCMs extracted from seven flagship smartphones from several major brands: the Apple iPhone X/XS/XR, Samsung Galaxy S9, Huawei P20 Pro, Huawei Mate 20 Pro, Xiaomi Mi8 Explorer Edition, Oppo Find X and Vivo X21UD.

Four years ago, only two cameras on average could be found in smartphone. Today this number has risen to four in order to add other features such as face recognition, with infrared camera modules, in the front camera or to improve the zoom in the rear camera.

We analyze rear and front-facing CCMs including standard mono modules, dual modules, iris scanners, 3D camera modules and triple modules. We also compare them in terms of structure overview, module integration, lens numbers and dimensions, CMOS Image Sensor resolution, pixel size and other parameters. Additionally, we have studied the costs of these camera modules to compare the economic choices of the manufacturers. We present a historical comparative review in the report for four players, Apple, Samsung, Huawei and Xiaomi, in order to show the evolution of their technological choices.

Yole Développement’s Status of the Camera Module Industry 2019 – Focus on WLO is accompanying this report.

**COMPLETE TEARDOWN WITH**
- Detailed photos
- Precise measurements
- Module cross-sections
- Sensor measurements
- Material analysis
- Manufacturing process flow
- Supply chain evaluation
- Manufacturing cost analysis
- Physical comparisons
- Cost comparisons
TABLE OF CONTENTS

Overview/Introduction
• Executive Summary
• Reverse Costing Methodology

Physical Analysis
• Summary of the Physical Analysis
• Consumer Smartphones

Rear-Facing
• Dual
  o Apple iPhone X/XS Max/XR
  o Samsung Galaxy S9
  o Oppo Find X
  o Xiaomi Mi8 Explorer Edition
  o Vivo X21UD
• Triple
  o Huawei Mate 20 Pro
  o Huawei P20 Pro

Front-Facing
• Mono
  o Huawei P20 Pro
  o Vivo X21UD

AUTHORS
Audrey Lahrach is in charge of costing analyses for IC, LCD & OLED Displays and Sensor Devices. She holds a Master degree in Microelectronics from the University of Nantes.

Guillaume Chevalier has joined System Plus Consulting in early 2018 to perform physical analyses. He holds a two-year university degree in technology of physical measurements and instrumentation technics, and previously worked for four years for chemistry, mechanical and mass-metrolgy laboratories.

LINKED REPORT
Status of the Camera Module Industry 2019 – Focus on Wafer Level Optics – Market and Technology Report by Yole Développement

Bundle offer possible with the Mobile Camera Module Comparison 2019, contact us for more information at sales@systemplus.fr.

RELATED REPORTS
Mantis Vision’s 3D Depth Sensing System in the Xiaomi Mi8 Explorer Edition
December 2018 - EUR 3,990*

Orbbec’s Front 3D Depth Sensing System in the Oppo Find X
November 2018 - EUR 3,990*

STMicroelectronics’ Near Infrared Camera Sensor in the Apple iPhone X
December 2017 - EUR 3,490*
WHAT IS A REVERSE COSTING®?

Reverse Costing® is the process of disassembling a device (or a system) in order to identify its technology and calculate its manufacturing cost, using in-house models and tools.

COSTING TOOLS

Our analysis is performed with our costing tools 3D Packaging CoSim+ and IC Price+.

System Plus Consulting offers powerful costing tools to evaluate the production cost and selling price from single chip to complex structures.

3D Packaging CoSim+
Cost simulation tool to evaluate the cost of any Packaging process: Wafer-level packaging, TSV, 3D integration...

IC Price+
The tool performs the necessary cost simulation of any Integrated Circuit: ASICs, microcontrollers, memories, DSP, smartpower...

ABOUT SYSTEM PLUS CONSULTING

System Plus Consulting is specialized in the cost analysis of electronics from semiconductor devices to electronic systems. A complete range of services and costing tools to provide in-depth production cost studies and to estimate the objective selling price of a product is available.

Our services:
- STRUCTURE & PROCESS ANALYSES
- CUSTOM ANALYSES
- COSTING SERVICES
- COSTING TOOLS
- TRAININGS

www.systemplus.fr
sales@systemplus.fr
ORDER FORM

Please process my order for “Mobile Camera Module Comparison 2019”
Reverse Costing® – Structure, Process & Cost Report
Ref: SP19440

- Full Structure, Process & Cost Report: EUR 6,490*
- Bundle offer possible with the Status of the Camera Module Industry 2019 – Focus on Wafer Level Optics Market and Technology report by Yole Développement, contact us.
- Annual Subscription offers possible from 3 reports, including this report as the first of the year. Contact us for more information.

SHIP TO
Name (Mr/Ms/Dr/Pr): ............................................................
Job Title: .............................................................................
Company: ...........................................................................
Address: ............................................................................
City: .................................................... State: ..........................................
Postcode/Zip: ........................................................................
Country: ..............................................................................
VAT ID Number for EU members: ........................................
Tel: ....................................................................................... 
Email: ...................................................................................
Date: .....................................................................................
Signature: ................................................................................

BILLING CONTACT
First Name : ............................................................................
Last Name: …….......................................................................
Email: …................................................................................
Phone: ……..............................................................................

PAYMENT
By credit card:  
Number: |__|__|__|__|  |__|__|__|__|  |__|__|__|__|
|__|__|__|__|  
Expiration date: |__|__|/|__|__|  
Card Verification Value: |__|__|__|

By bank transfer:
HSBC, 1 place de la Bourse, F-69002 Lyon, France
SWIFT or BIC code: CCFRFRPP
Bank code : 30056 - Branch code : 00170 - Account : 0170200156587
IBAN: FR76 3005 6001 7001 7020 0156 587

*For price in dollars please use the day’s exchange rate
*All reports are delivered electronically in pdf format
*For French customer, add 20% for VAT
*Our prices are subject to change. Please check our new releases and price changes on www.i-micronews.com. The present document is valid 6 months after its publishing date: January 2019

ANNUAL SUBSCRIPTIONS
Each year System Plus Consulting releases a comprehensive collection of new reverse engineering and costing analyses in various domains. You can choose to buy over 12 months a set of 3, 4, 5, 7, 10 or 15 Reverse Costing® reports.

Up to 47% discount!

More than 60 reports released each year on the following topics (considered for 2018):
- Power: GaN - IGBT - MOSFET - Si Diode - SiC
- Imaging: Camera - Spectrometer
- LED and Laser: UV LED – VCSEL - White/blue LED
- Packaging: 3D Packaging - Embedded - SIP - WLP
- Integrated Circuits: IPD – Memories – PMIC - SoC
- RF: FEM - Duplexer
- Systems: Automotive - Consumer - Energy - Telecom
TERMS AND CONDITIONS OF SALES

1. INTRODUCTION
The present terms and conditions apply to the offers, sales and deliveries of services managed by System Plus Consulting except in the case of a particular written agreement. Buyer must note that placing an order means an agreement without any restriction with these terms and conditions.

2. PRICES
Prices of the purchased services are those which are in force on the date the order is placed. Prices are in Euros and worked out without taxes. Consequently, the taxes and possible added costs agreed when the order is placed will be charged on these initial prices.
System Plus Consulting may change its prices whenever the company thinks it necessary. However, the company commits itself in invoicing at the prices in force on the date the order is placed.

3. REBATES and DISCOUNTS
The quoted prices already include the rebates and discounts that System Plus Consulting could have granted according to the number of orders placed by the Buyer, or other specific conditions. No discount is granted in case of early payment.

4. TERMS OF PAYMENT
System Plus Consulting delivered services are to be paid within 30 days end of month by bank transfer except in the case of a particular written agreement.
If the payment does not reach System Plus Consulting on the deadline, the Buyer has to pay System Plus Consulting a penalty for late payment the amount of which is three times the legal interest rate. The legal interest rate is the current one on the delivery date. This penalty is worked out on the unpaid invoice amount, starting from the invoice deadline. This penalty is sent without previous notice.
When payment terms are over 30 days end of month, the Buyer has to pay a deposit which amount is 10% of the total invoice amount when placing his order.

5. OWNERSHIP
System Plus Consulting remains sole owner of the delivered services until total payment of the invoice.

6. DELIVERIES
The delivery schedule on the purchase order is given for information only and cannot be strictly guaranteed. Consequently any reasonable delay in the delivery of services will not allow the buyer to claim for damages or to cancel the order.

7. ENTRUSTED GOODS SHIPMENT
The transport costs and risks are fully born by the Buyer. Should the customer wish to ensure the goods against lost or damage on the base of their real value, he must imperatively point it out to System Plus Consulting when the shipment takes place. Without any specific requirement, insurance terms for the return of goods will be the carrier current ones (reimbursement based on good weight instead of the real value).

8. FORCE MAJEURE
System Plus Consulting responsibility will not be involved in non execution or late delivery of one of its duties described in the current terms and conditions if these are the result of a force majeure case. Therefore, the force majeure includes all external event unpredictable and irresistible as defined by the article 1148 of the French Code Civil?

9. CONFIDENTIALITY
As a rule, all information handed by customers to system Plus Consulting are considered as strictly confidential. A non-disclosure agreement can be signed on demand.

10. RESPONSIBILITY LIMITATION
The Buyer is responsible for the use and interpretations he makes of the reports delivered by System Plus Consulting. Consequently, System Plus Consulting responsibility can in no case be called into question for any direct or indirect damage, financial or otherwise, that may result from the use of the results of our analysis or results obtained using one of our costing tools.

11. APPLICABLE LAW
Any dispute that may arise about the interpretation or execution of the current terms and conditions shall be resolved applying the French law.
It the dispute cannot be settled out-of-court, the competent Court will be the Tribunal de Commerce de Nantes.