

台冠科技有限公司

TopGroup Technology Limited



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01 **Company Overview**

Company Overview

TopGroup Technology Ltd

Headquarter : Nanshan District, Shenzhen, China

Shenzhen TopGroup Technology



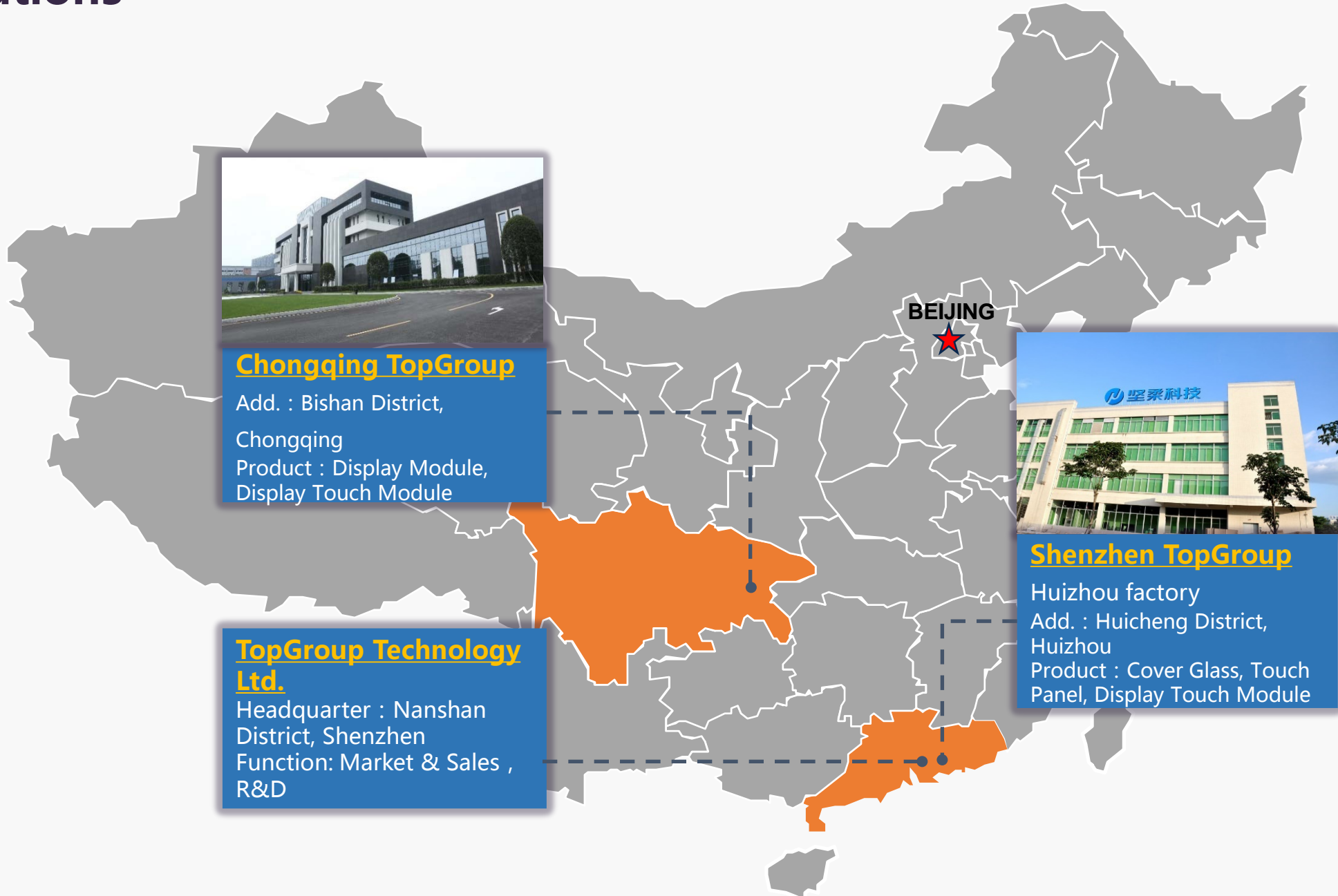
- Established in 2012
- Number of employees: 2,000 people, factory area: 50,000 square meters
- Main business: cover glass, touch panel, display touch module

Chongqing TopGroup Technology

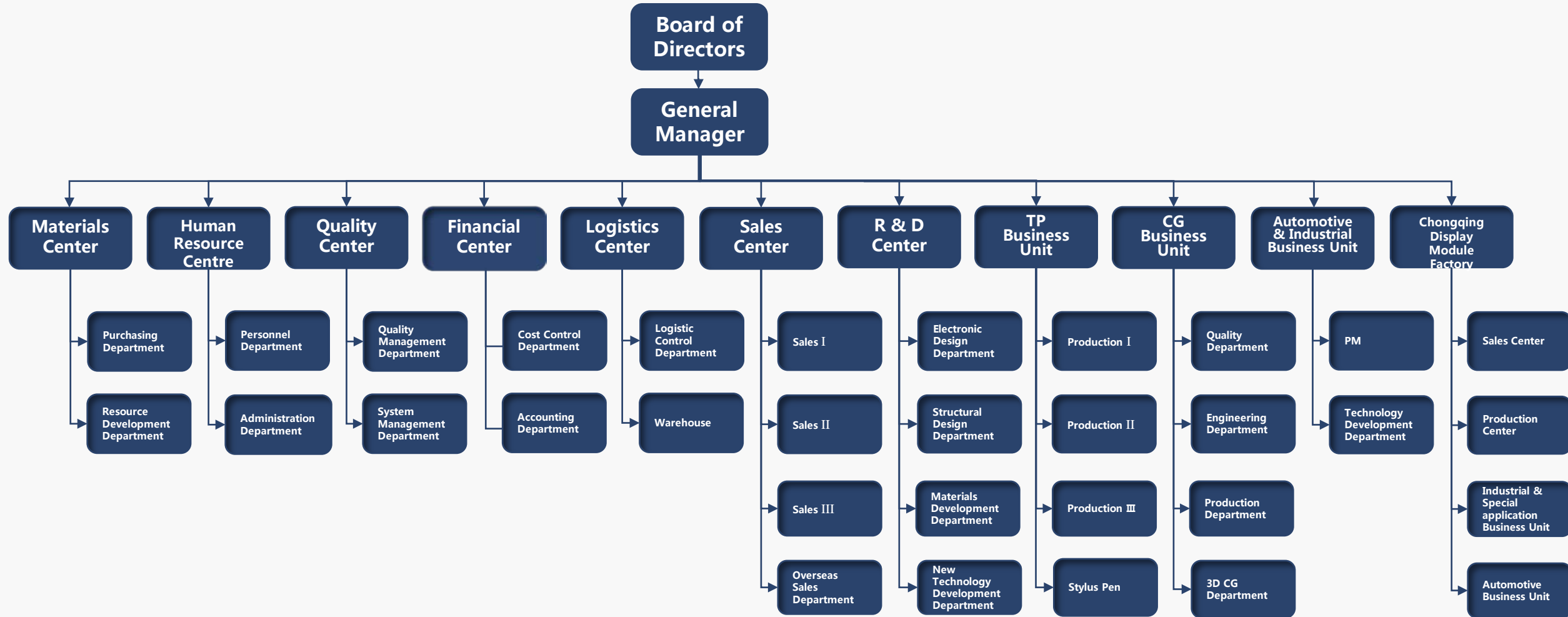


- Established in 2018
- Number of employees: 1,000 people, factory area: 15,000 square meters(Phase I)
- Main business: display module, display touch module

Locations



Organizations



Main Product

Cover Glass



AG/AR/AF



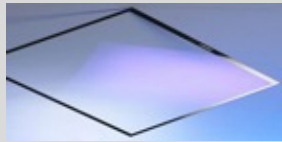
CG with Drilling



CG with Pattern



CG with 3D Key



AG/AR



3D CG

Touch Panel



OGS



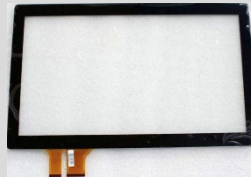
GG



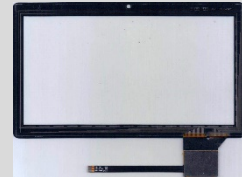
PG



PG

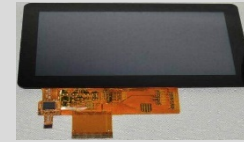


GF/GFF



Metal Mesh

LCM+TP



LCM+OCA+Lens



LCM+OCR+CTP



LCM+OCR+Lens



LCM+OCR+CTP



LCM+OCR+CTP

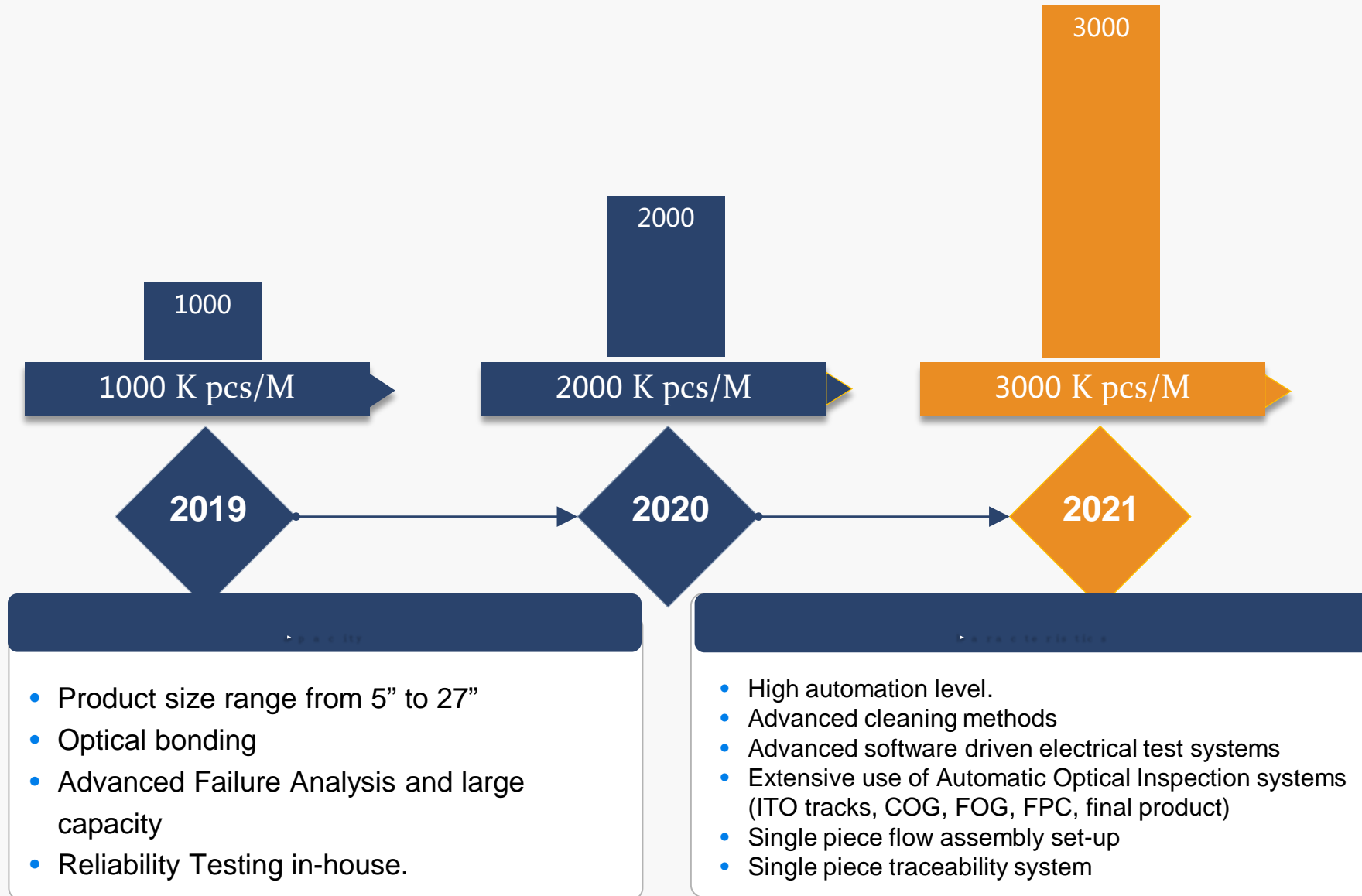


LCM+OCR+CTP

Capacity

Product		Capacity 2019 (Pcs/M)	Note
CG	Type : 2.5D/3D Cover Glass Material : Corning/Soda Line	2KK	Base on 10.1"
TP	Glass/Film Sensor TP Module	3KK	Base on 10.1"
	Metal mesh (Unipixel/Fuji Film)	3KK	Base on 10.1"
Stylus Pen	Stylus Solution	1KK	
LCM	TFT Module	1KK	Base on 10.1"
TP+LCM	Full lamination (OCA/OCR)	2KK	Base on 10.1"

Chongqing Factory Plan

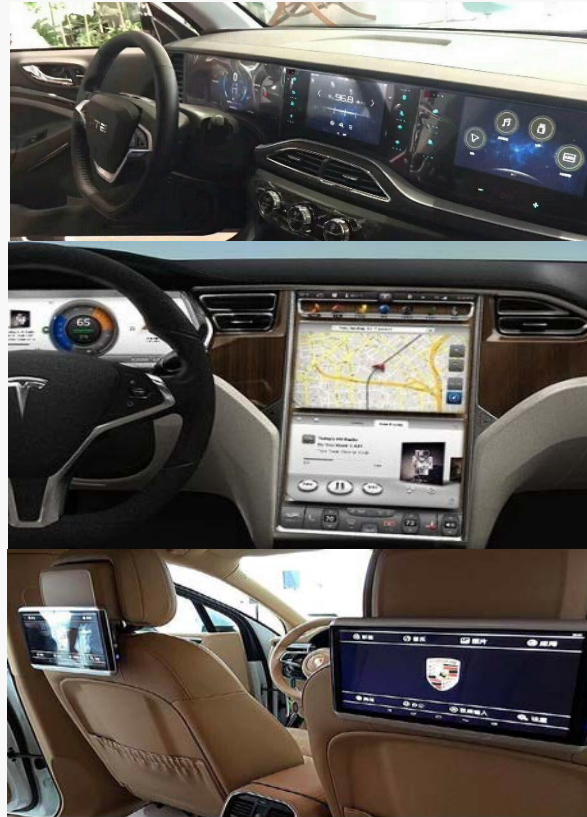


Main Applications

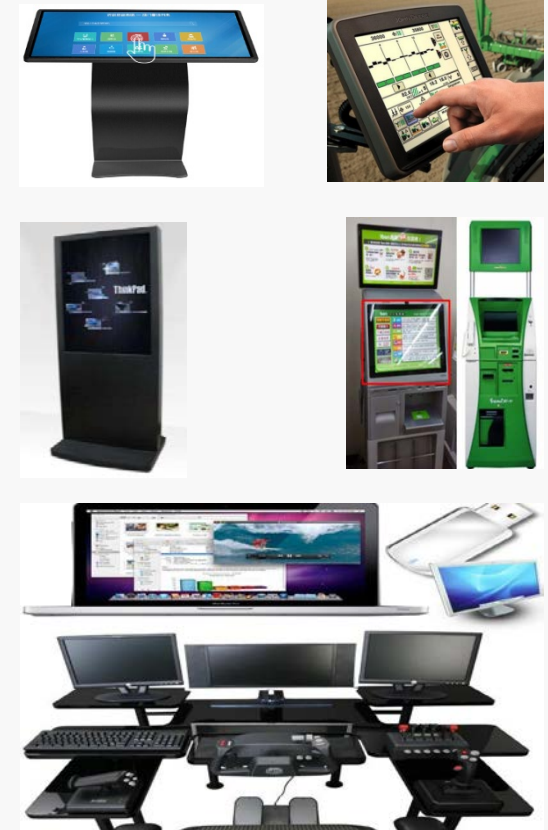
Consumer Electronic



Automotive



Industry



System Certifications



ISO9001:2008 & ISO14001:2004 1st Certification in 2012
 2nd Certification in 2015
 ISO9001:2015 & ISO14001:2015 1st Certification in 2017



ISO/TS16949:2009 1st Certification in 2016
 IATF16949:2016 1st Certification in 2017



QC080000:2012 1st Certification in 2016
 QC080000:2017 1st Certification in 2017

Main Customers

Consumer

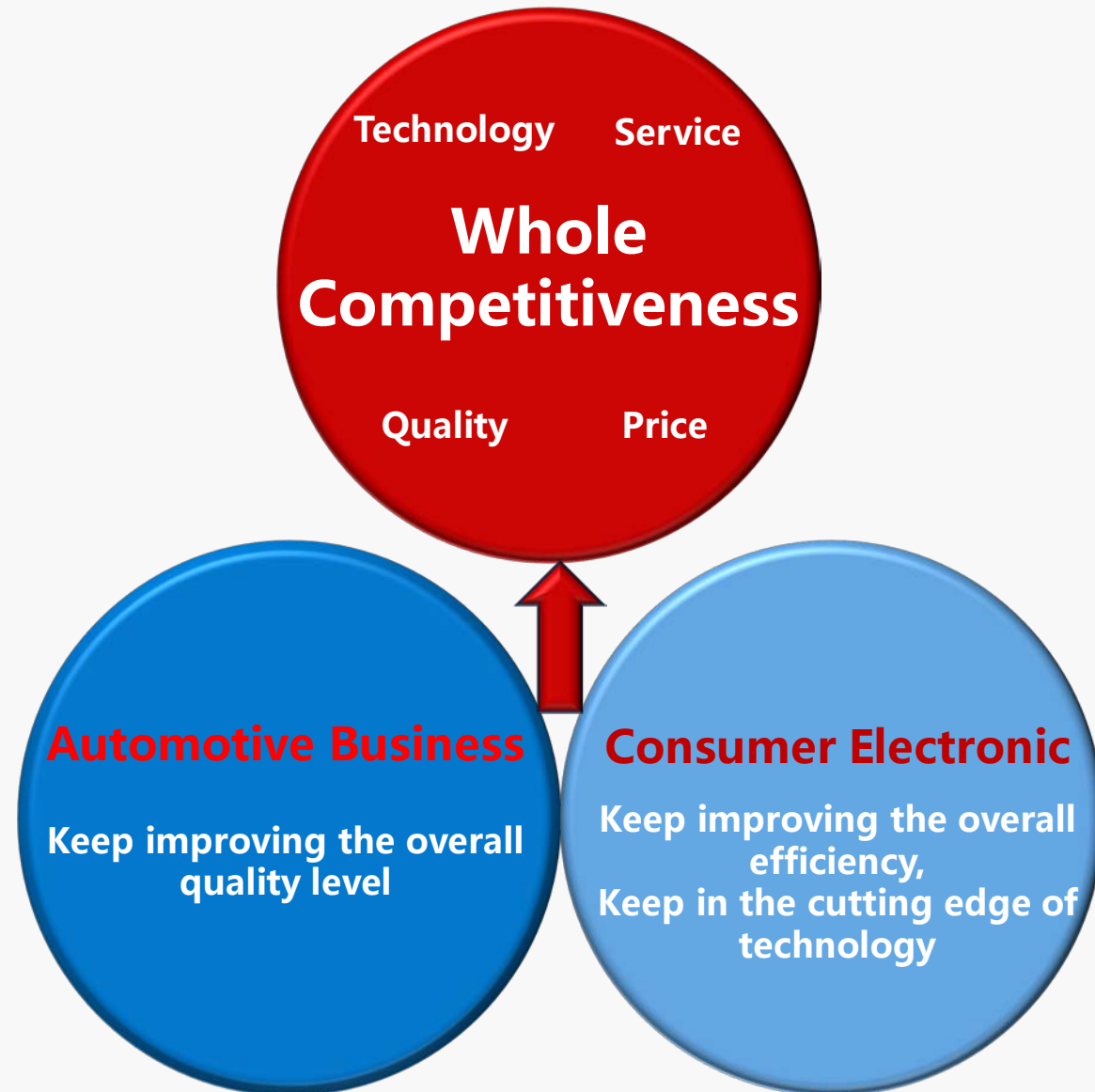


Automotive

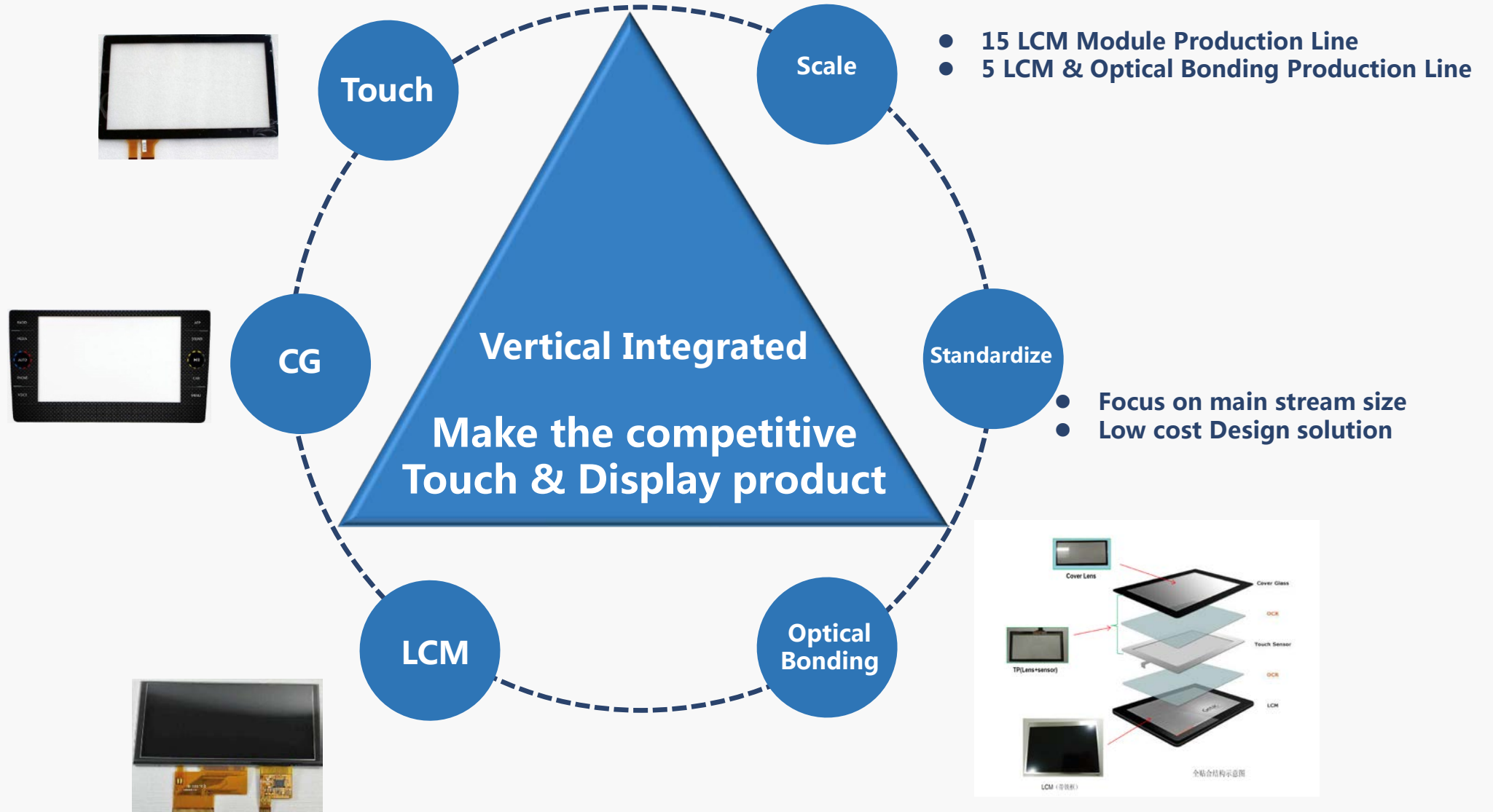


02 Development Plan

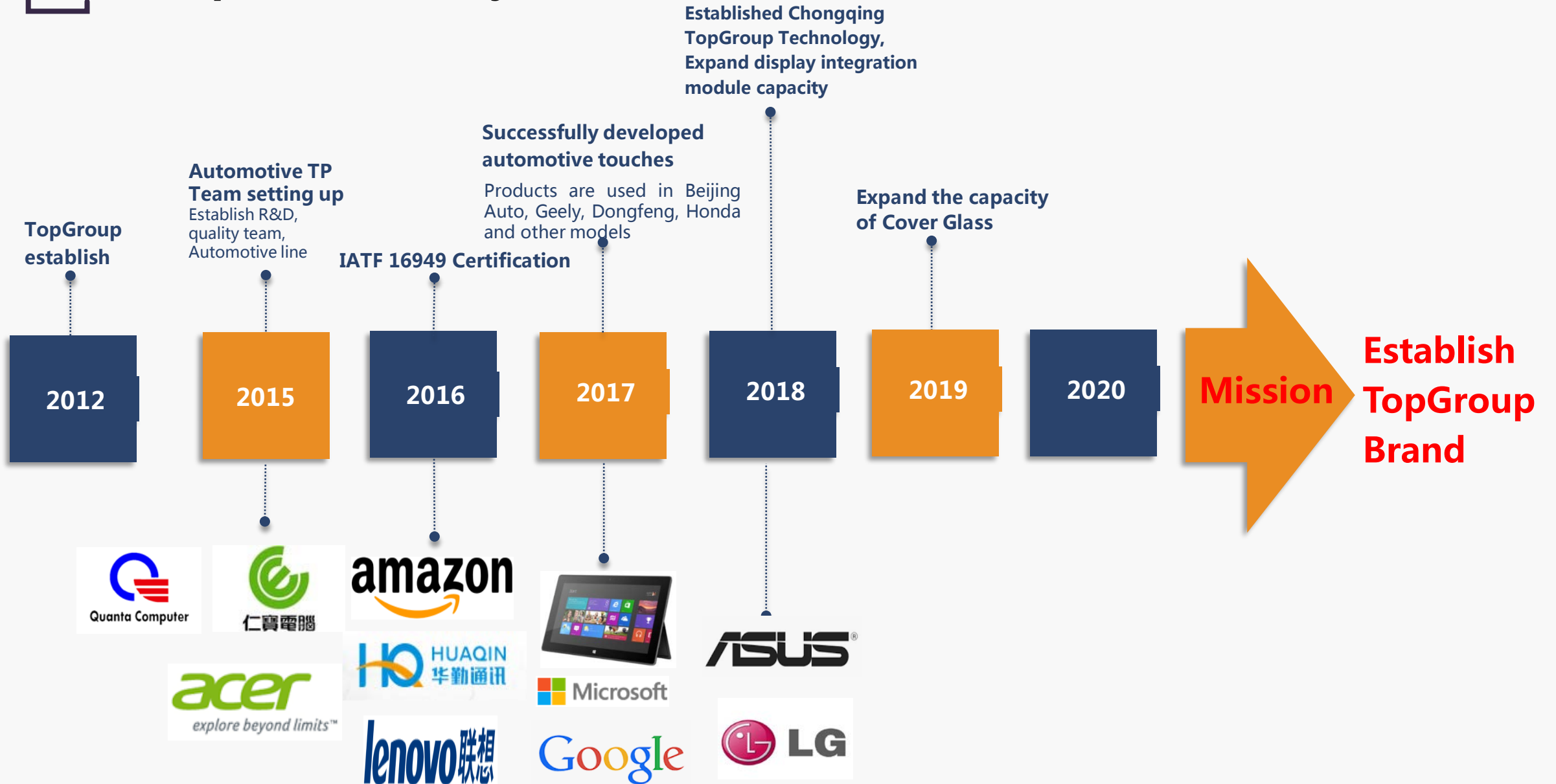
Development Strategy



Development Strategy



Development History



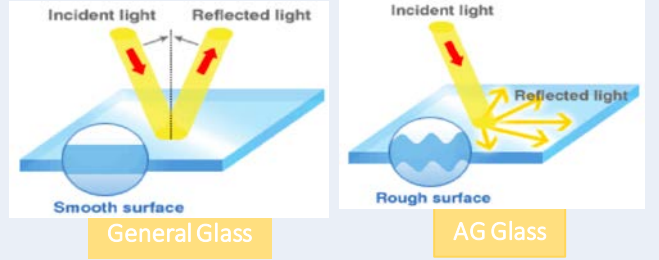





03 Product & Technology

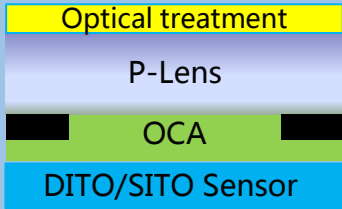
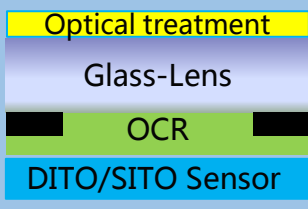
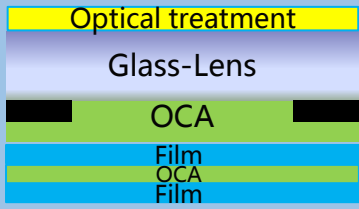
Cover Glass

Product type		2D(P-Lens)	2D(G-Lens)	2.5D(G-Lens)
Material		PET/PMMA/PMMA&PC	Glass	Glass
Size		<32inch	<32inch	<13.3inch
Thickness		0.4~5mm	0.3~2mm	0.3~2mm
Outline tolerance		3~6inch: $\pm 0.05\text{mm}$ $\geq 7\text{inch}$: $\pm 0.1\text{mm}$	3~6inch: $\pm 0.05\text{mm}$ $\geq 7\text{inch}$: $\pm 0.1\text{mm}$	3~6inch: $\pm 0.05\text{mm}$ $\geq 7\text{inch}$: $\pm 0.1\text{mm}$
Corner R		$\geq 0.3\text{mm}$	$\geq 0.3\text{mm}$	$\geq 0.3\text{mm}$
Through hole		$\geq 1.2 \pm 0.1\text{mm}$	$\geq 1.2 \pm 0.1\text{mm}$	$\geq 1.2 \pm 0.1\text{mm}$
Strengthening	Soda	-	CS > 480Mpa DOL > 8uM	-
	Al-si	-	CS > 650Mpa DOL > 35uM	CS > 650Mpa DOL > 35uM
Optical treatment		AG/AR/AF	AG/AR/AF	AG/AR/AF
Water droplet angle (w/t AF)		> 110°	> 110°	> 110°
Oil print tolerance		6~10inch: $\pm 0.1\text{mm}$ > 11inch: $\pm 0.15\text{mm}$	6~10inch: $\pm 0.1\text{mm}$ > 11inch: $\pm 0.15\text{mm}$	6~10inch: $\pm 0.1\text{mm}$ > 11inch: $\pm 0.15\text{mm}$
Adhesion Cross-Cut		> 4B	> 4B	> 4B
Tr%		$\geq 90\%$	$\geq 92\%$	$\geq 92\%$
Operation temp.		-30~85°C	-30~85°C	-30~85°C
Storage temp.		-30~95°C	-40~95°C	-40~95°C
Samples lead-time		1~2weeks	1~2weeks	1~2weeks

Cover Glass Technology

Surface Technology	AF Anti-Fingerprint	AR Anti-Reflection	AG Anti-Glare
Mechanism	The surface forms an oil-repellent and waterproof organic molecular layer, which reduces fingerprint adhesion.	The surface forms optical film structure, increasing light transmission and reducing reflection.	The surface is microscopically uneven, producing diffuse reflection and scattered reflection.
			
Material & Method	Glass: Spray, Vapor Deposition PET/TAC: Coating, PC/PMMA: Evaporation	Glass: Evaporation, PET/TAC: Coating, PC/PMMA: Evaporation	Glass: Etching, Spraying, PET/TAC: UV Transfer Coating PC/PMMA: Infiltration
Parameters	Water drop angle $\geq 110^\circ$	Reflectance $\leq 0.6\%$	Gloss range 50-120
Other Processing	Drilling	Special Texture	3D
Example			

Touch Panel

	PG	GG	GFF
Product type & structure			
Cover material	PET/PMMA/PMMA&PC	Glass	Glass
Size	<65inch	<65inch	<65inch
Sensor thickness	0.4mm 0.55mm 0.7mm 1.1mm 1.8mm	0.4mm 0.55mm 0.7mm 1.1mm 1.8mm	0.05mm 0.1mm 0.125mm
Tr%	> 89%	> 91%	> 89%
Reflection rate (w/t AR)	< 1%	< 1%	< 1%
Optical treatment	AG/AR/AF	AG/AR/AF	AG/AR/AF
Explosion-proof	Yes	Yes(w/t AG/AR/AF Film)	Yes(w/t AG/AR/AF Film)
Full lamination type	OCR/OCA	OCR/OCA	OCR/OCA
Operation temp.	-30~85℃	-30~85℃	-30~85℃
Storage tem.	-40~95℃	-40~95℃	-40~95℃
Samples lead-time	2~3weeks	2~3weeks	2~3weeks

Touch panel Roadmap

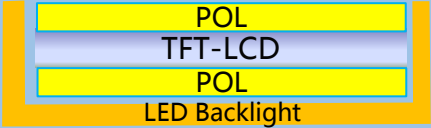


Roadmap	Solution	2017		2018		2019	
		1H	2H	1H	2H	1H	2H
Touch Panel (F-sensor)	Ultrathin	250 (100+50+50+50) / 145 (50+45+50) μm				118 (50+45+23) μm	
	narrow bezel	40/40,30/30(Silver Routing)				25/25	
	Low impedance	150 Ω/\square (ITO)				100 Ω/\square , 80 Ω/\square	
New Material	Metal Mesh	30 Ω/\square (Ag Mesh) , T=50 $\mu\text{m}/38\mu\text{m}$, 88% , L/S=20 $\mu\text{m}/20\mu\text{m}$				< 20- Ω/\square (Ag / Cu Mesh) 90% , L/S=15 $\mu\text{m}/15\mu\text{m}$	
	COP					92% , 50 μm , Haze<0.1%	
Large size TP	Metal Mesh					Ag Mesh / Cu Mesh 85" -	
	GFF					60-100 Ω/\square 65" -	
	G/G	43" - , 43" - 65"					
	Ultrathin (G-Sensor)	... 0.9mm,0.7mm,0.55mm,0.4mm , 0.33mm				0.25mm, 0.2mm,0.15mm	



Touch Panel Reliability Data

No.	Test Items	Test Conditions	PG	GG	GFF
1	High Temperature and Humidity	+85°C 85%RH, 1000h	Pass	Pass	Pass (500H)
2	High Temperature Storage	+95°C, 1000h	Pass	Pass	Pass (500H)
3	High Temperature Operation	+85°C, 1000h	Pass	Pass	Pass (500H)
4	Low Temperature Storage	-40°C, 1000h	Pass	Pass	Pass (500H)
5	Low Temperature Operation	-30°C, 1000h	Pass	Pass	Pass (500H)
6	Temperature Shock Cycle	-40°C(30min)~ +95°C(30Min), 1000cycle	Pass	Pass	Pass (500Cycles)
7	Anti-UV Test	0.35 ± 0.02 W/(m ² · nm) at 340 nm at 45°C , 240H	Pass	Pass	Pass
8	ESD Test	Air discharge: ±25kv, Contact discharge: ±8kv	Pass	Pass	Pass

LCM

	LCM	LCM+CG	LCM+CTP
Product type & structure			
Size	<65inch	<65inch	<65inch
Resolution	800x480~1920x1080	800x480~1920x1080	800x480~1920x1080
Luminance	600nit~1200nit	600nit~1200nit	600nit~1200nit
Contrast	1000:1	1000:1	1000:1
NTSC	70%~85%	70%~85%	70%~85%
Reflection rate (w/t AR)	-	< 1%	< 1%
Optical treatment	AG	AG/AR/AF	AG/AR/AF
Interface	LVDS	LVDS	LVDS
Lamination	-	OCR/OCA	OCR/OCA
Operation temp.	-30~85℃	-30~85℃	-30~85℃
Storage temp.	-40~95℃	-40~95℃	-40~95℃
Samples lead-time	5~6weeks	6~8weeks	6~8weeks

LCM Technology Roadmap

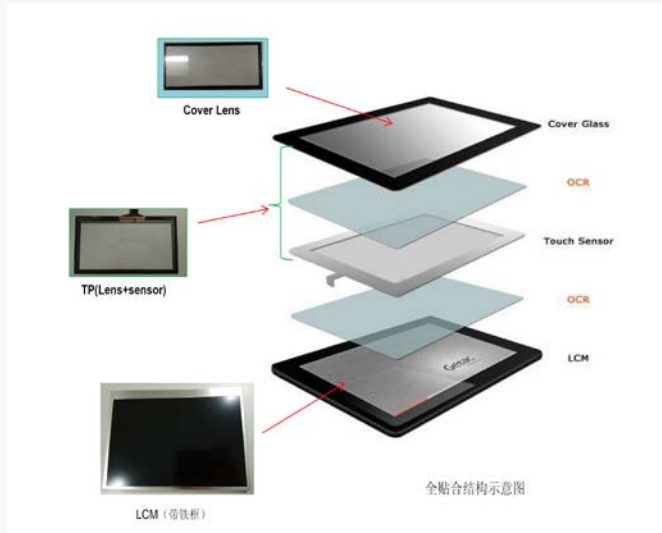
No.	Items	2019H1	2019H2	2020H1	2020H2
1	NTSC	85%	⇒	95%	
2	Contract Ratio	1200:1		⇒	1500:1
3	Response Time	25°C : 25ms; -20°C : 200ms; -30°C : 400ms		⇒	25°C : 19ms; -20°C : 150ms; -30°C : 350ms
4	Viewing Angle	A+area:1000, A area:650, B area:350		⇒	A+area:1200, A area:700, B area:350
5	Brightness	1000cd/m2			
6	Resolution	200PPI以上			
7	Free Form	Corner Cut, Drilling			
8	Optical Bonding	OCA or OCR		⇒	3D Lamination

Optical Bonding

	Open cell lamination	LCM lamination	Multi-module Lamination
Lamination & structure	<p>Cover glass OCR/OCA POL TFT-LCD POL</p>	<p>Cover glass OCR POL TFT-LCD POL LED Backlight</p>	<p>Cover glass OCR POL TFT-LCD POL LED Backlight Touch Sensor OCR POL TFT-LCD POL LED Backlight</p>
Size	7inch~32inch	7inch~32inch	7inch~12.3inch
Glue material	OCR/OCA	OCR	OCR
Glue thickness	0.2~0.5mm	0.5~1mm	0.5~1mm
Display Qty.	1	1	2~3
Operation temp.	-30~85℃	-30~85℃	-30~85℃
Storage temp.	-40~95℃	-40~95℃	-40~95℃
Lead-time	1weeks	1weeks	1weeks

- ※ ① Recommend Open cell lamination, since less glue consumption and price advantage .
 ② Can meet the diversified needs of customers (open cell、 LCM、 Multi-module) .

Optical Bonding








NOW
2D



2020
3D



Stylus Pen

	Active capacitor pen	Passive pen	2.4G Wireless Charging Pen	Active capacitor pen	Active capacitor pen
					
Solution	Goodix Solution	TAIGUAN Solution	TAIGUAN Solution	Goodix Solution	Goodix Solution
Pressure Level	1024 stage pressure induction	NA	1024 stage pressure induction	1024 stage pressure induction	1024 stage pressure induction
Charging	NA	NA	Wireless charging	NA	Wired/Wireless charging
Status	MP	MP	MP	Development Phase	Development Phase
Application	Apply to Tablet PC	Apply to Tablet PC	Apply to smart whiteboard 55 inches to 108 inches	Apply to Tablet PC	Apply to Tablet PC
Others				Increase Bluetooth functionality	

04 Production Line

Cover Glass Production Line



Cutting

1. Equipment processing accuracy is $\pm 0.10\text{mm}$.
2. Cutting pressure control accuracy is 0.01Mpa .



CNC

- 1, Processing accuracy $\pm 0.02\text{mm}$.
2. The spindle shaft swings $< 0.005\text{mm}$.
- 3, vacuum adsorption detection accuracy $< 1\text{kpa}$.



Cleaning

1. Current control accuracy $\pm 0.1\text{a}$.
- 2, Drying temperature control accuracy $\pm 5^\circ\text{C}$.
- 3, Positioning accuracy $< 1\text{mm}$.



Strengthen

1. Temperature control accuracy $\pm 2^\circ\text{C}$.
- 2, Time control accuracy error $< 2\text{ seconds}$.
- 3, The positioning arm positioning accuracy $\pm 0.05\text{mm}$



Cleaning



Print

1. The positioning accuracy of the printing machine is $\pm 0.05\text{mm}$.
2. Tunnel furnace temperature control accuracy $\pm 5^\circ\text{C}$.
3. The positioning accuracy of the manipulator is $\pm 0.03\text{mm}$.



Coating

Visual Inspection

Touch Panel Production Line (1)



RTR aging
Temperature: 150



Sheet by sheet exposure
Class 100 clean room



Sheet by sheet Printing AG
CCD automatic alignment



Sheet by sheet
L/W:30um/30um



RTR dry film , cutting



Sheet by sheet DES



Sheet by sheet IR



Cleaning



Touch Panel Production Line (2)



Film to Film OCA lamination



Testing



Hot pressing bonding
CCD automatic alignment



Automatic attaching
machine



Laser/die cutting
Tolerance control: +/-0.15mm



ACF attaching



Film and Cover glass OCA
lamination



LCM Production Line



Cleaning



Polarizer Attaching



Autoclave



AOI



Silicon Glue Coating



FPC Bonding



IC Bonding



Module Assembly



Aging

Testing and Analysis Equipment (1)



Four points bending tester



Falling ball tester



Pull test



2D measuring instrument



Automatic Hardness tester



Stress tester

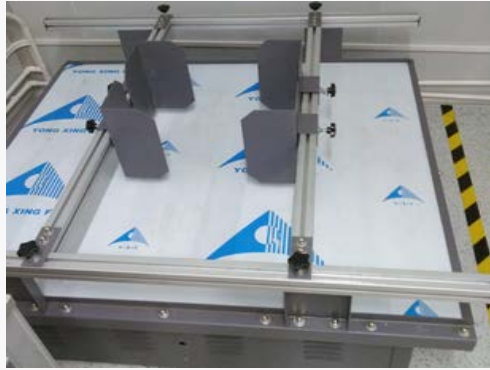


3D automatic measuring instrument



Salt spray tester

Testing and Analysis Equipment (2)



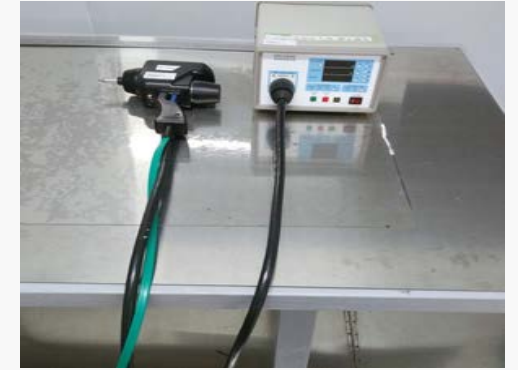
Vibration tester



Humidity Chamber



Thermal shock chamber



ESD tester



Water drop angle tester



XRF detector



Automatic measuring system



Material testing machine

Testing and Analysis Equipment (3)



Optical characteristic automatic test system



Automatic image measuring instrument



Mechanical impact testing machine



Constant temperature and humidity chamber



Temperature & humidity & vibration test chamber



Constant temperature and humidity chamber



Constant temperature and humidity chamber



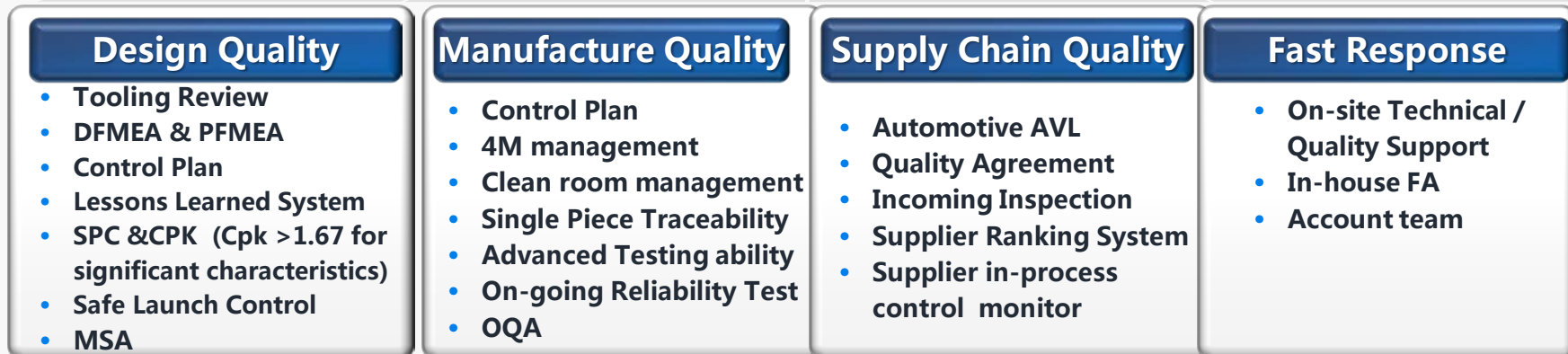
Thermal shock testing chamber

05 Customer Satisfaction

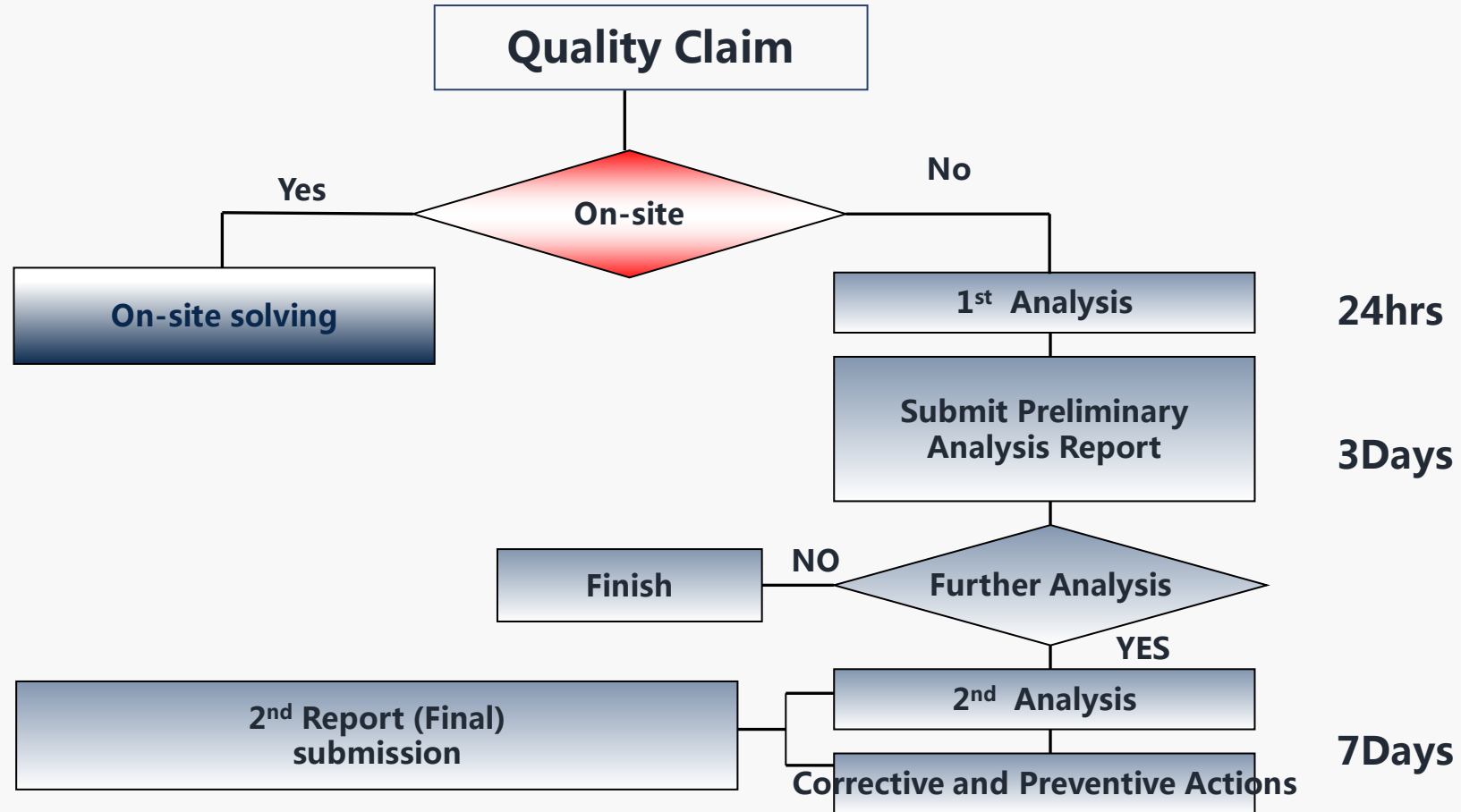
0 DEFECT
DETECT

Be
Customer
priority
Supplier in
Quality

Quality Assurance



Quality Service



A dark blue horizontal bar spans the width of the slide. Two thin orange lines are positioned horizontally, one on the left and one on the right, intersecting the blue bar.

THANK YOU