

Novel Plasma Sterilizer, STERLINK

Presented by Dr. Youbong Lim, CEO

STERLINK

STERLINK MINI

STERLINK HOME

STERLINK PRO



Plasmapp develops innovative technology and products of
Plasma Sterilization and surface Treatment for Medical applications
Faster, more Affordable and Reliable
than any other company in the world.

IPO in 2022

26 M USD

Starting with TIPS Program in 2015

91 Patents

Keys in US, EU, China and Japan

60 Countries

Export percentage more than 70%

412 %

Consumables CAGR, FY2018-2020

2015 – 4 MEMBERS

2017 – 20 MEMBERS

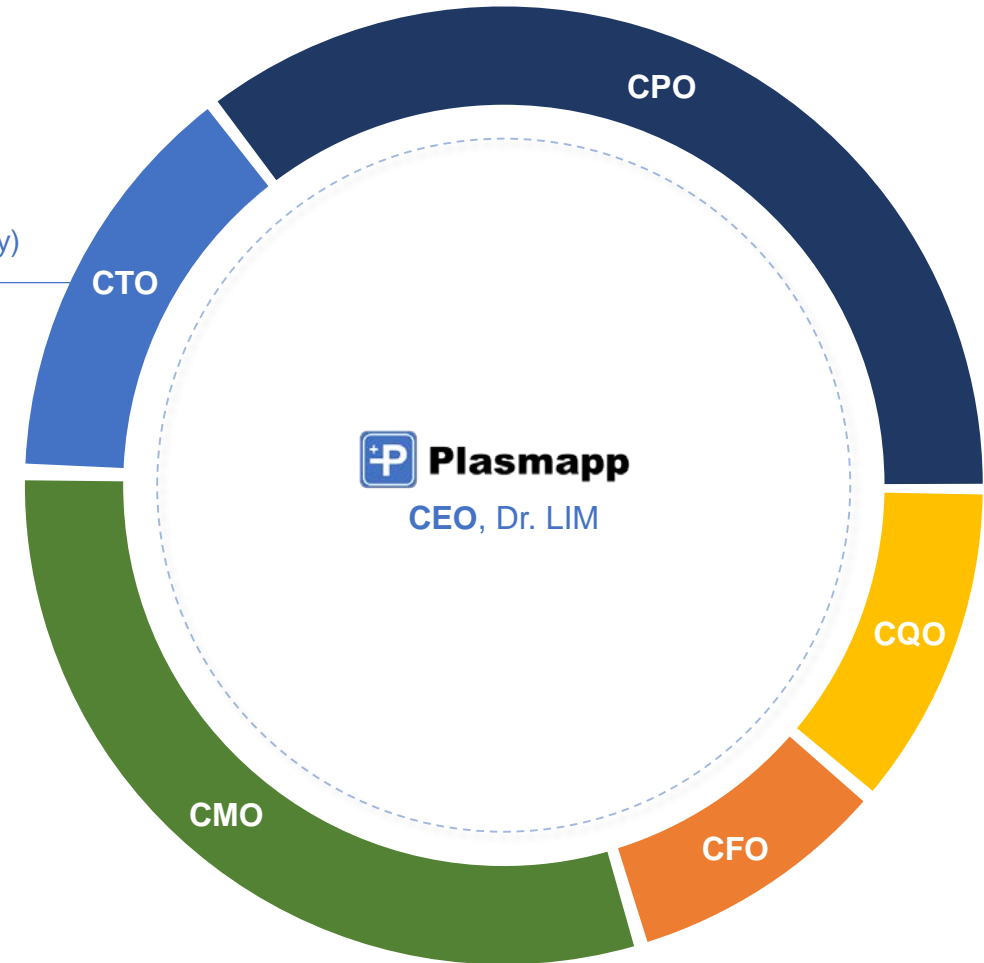
2019 – 60 MEMBERS

2021 – 100 MEMBERS

- R&D: 16%** (CTO, Dr. LEE)
- Production: 29%** (CPO, Dr. KIM)
- Quality: 14%** (CQO, Mr. JUNG)
- Management: 12%** (CFO, Mr. SONG)
- Sales and Marketing: 29%** (CMO, Mr. KIM)

- RA (Regulatory Affair)
- PV (Process Validation)
- PT (Product Technology)
- MT (Manufacturing Technology)

Name	Academic Background	Specialty
LIM, Youbong	Physics, KAIST BA, MA, PhD	Plasma source development (CEO)
LEE, Seung Hun	Physics, POSTECH BA, KAIST MA, PhD	Plasma diagnostics, Process development (CTO)
KIM, Jun Young	Physics, Junbuk BA, MA, UST PhD	Mechanical device development (CPO)
LEE, Sun Byung	Mechanical Engineering, PhD	Dental implant development
JEON, HyunJeong	Life Science, Sangmyung Univ., BS, PhD	Process development and Biological safety validation



Plasmapp Timeline

IPO in 2022

- 2015**
Plasmapp Co., Ltd. founded as **KAIST** Startup company
- 2015**
Series-A funding from Samsung and other VCs, **3M USD**
- 2017**
Series-B funding from LB and other VCs, **9M USD**
- 2019**
Series-C funding from KTB and other VCs, **14M USD**

\$26M

91 Patents for 5 years

Core **Technology** and Products Developed

Production **QMS** (Quality Management System): **GMP, ISO 13485, MDSAP** Certified
 Korea FDA → CE MDD → Australia TGA → Health Canada → Brazil ANVISA → Saudi FDA → Taiwan FDA → Malaysia FDA → Japan FDA → **US FDA (4Q, 2020)** → China FDA (2Q, 2021)



- 2015**
Technology Development
Direct-injection
- 2017**
STERPACK
- 2018**
STERLINK FPS
- 2019**
STERLINK Mini
and ODM (GC Corporation)
- 2020**
ACTILINK, ACTILOAD, LINK SYSTEM
ODM
STERLINK ENDO

STERPACK
World 1st Low-Temp 7 Min Sterilization
 Developed for Super-fast Sterilization with Advanced Injection Control with vacuuming

STERLINK FPS
The 1st STERLINK of Plasmapp, Alternative to EtO Gas
 More affordable for **Specialty Clinics** such as Ophthalmology, Dental, Urology, GYN, Veterinary etc.

STERLINK Mini and its ODMs
Improved space efficiency
 → Needs given increasing surgical procedure in **Dental Clinics**

ACTILINK & ACTILOAD
*Novel Plasma treatment for **Dental** implant*
 Developed for super-fast treatment to increase Osseointegration in Dental Clinics

A1 Plasma Sterilization

Brand: **STERPACK®**



Brand: **STERLINK®** (Model: FPS, MINI, ENDO)



A2 Plasma Surface Treatment

Brand: **ACTILOAD™**

Brand: **ACTILINK™**



- **KR1103758® (JP/US)**
Vacuum Pouch consisting of a sterilizer storage space, a cap, and a sealing film that seals it

- **KR1224842®**
Apparatus for supplying the sterilizer extracted by being stabbed by the needle of the cartridge

- **KR1827335® (CN/DE/JP/US)**
Sterilization device that vents after processing by injecting sterilizer into the exhausted packaging

- **KR1924992® (EP/US)**
Sterilization device that can selectively operate pouch mode and chamber mode

- **KR2102601®**
Structure that allows vaporized sterilizer injection and internal air exhaustion to be done in the same passage

- **KR2049727® (WO application)**
Sterilization system consisting of an external chamber module independent of the pump

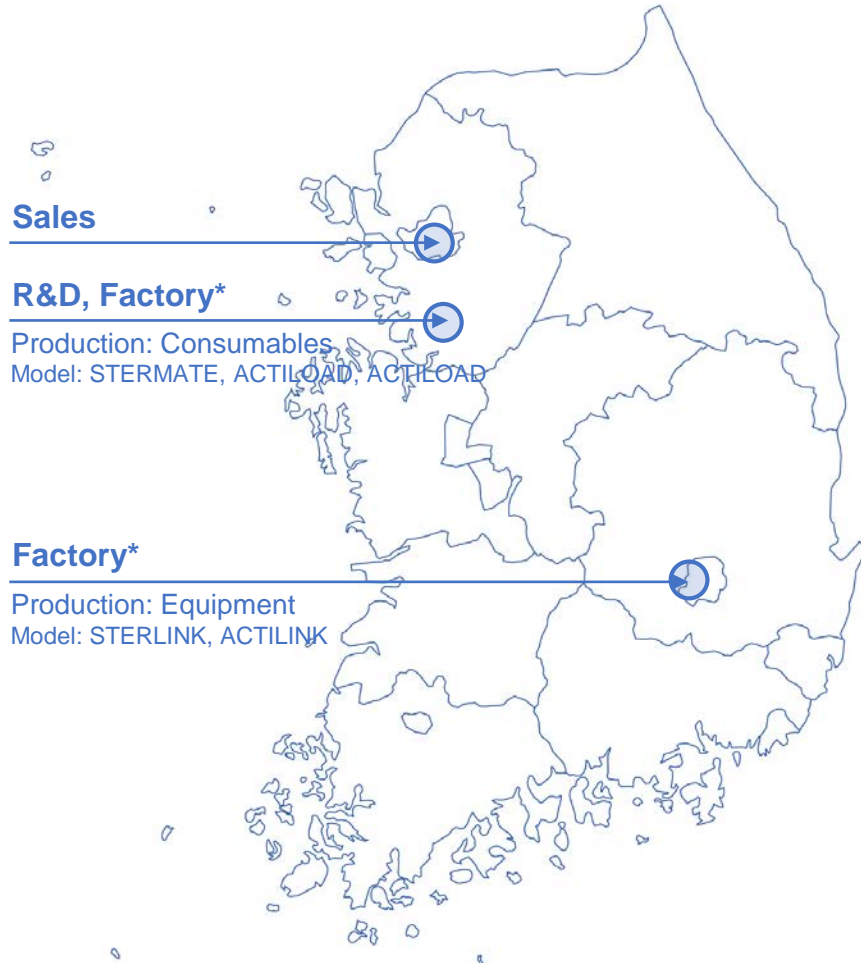
- **KR20190144259**
Sterilization system that can be operated to evacuate multiple chambers as a one pump

- **KR2020 (To be)**

- **KR20200054652**
Container for storing implants under vacuum
Container that can be easily vented to open
Sealing member for temporary path formation
Container where the implant becomes the high voltage part of the DBD and the inner space becomes the dielectric region

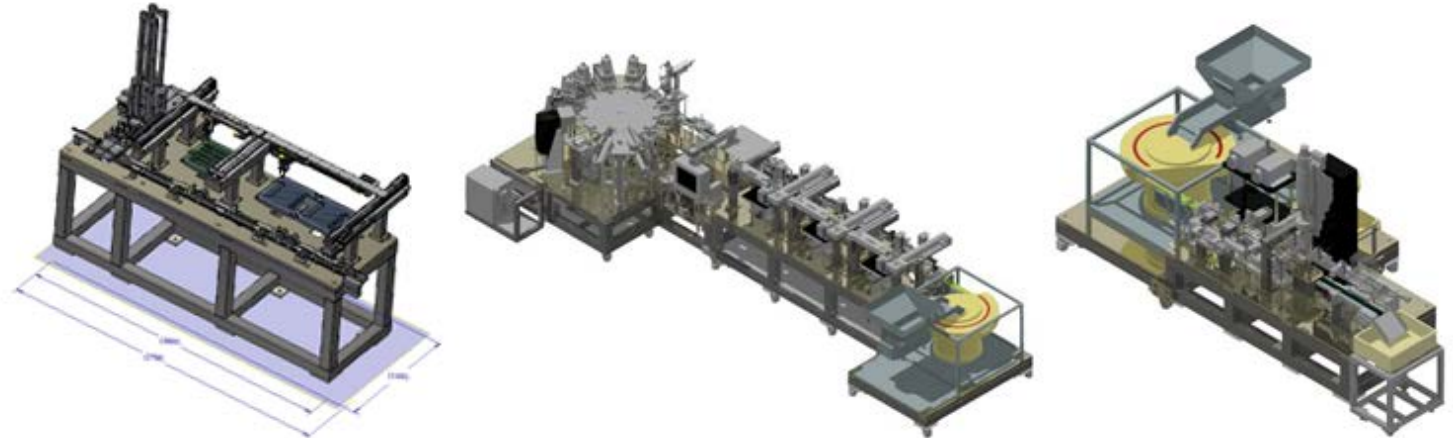
- **KR20200054652**
Plasma treatment of the object under vacuum
Simultaneous/individual treatment of multiple objects
Cover to secure the safety of treatment operation
Treatment unit externally independent of the pump

91 PATENTS



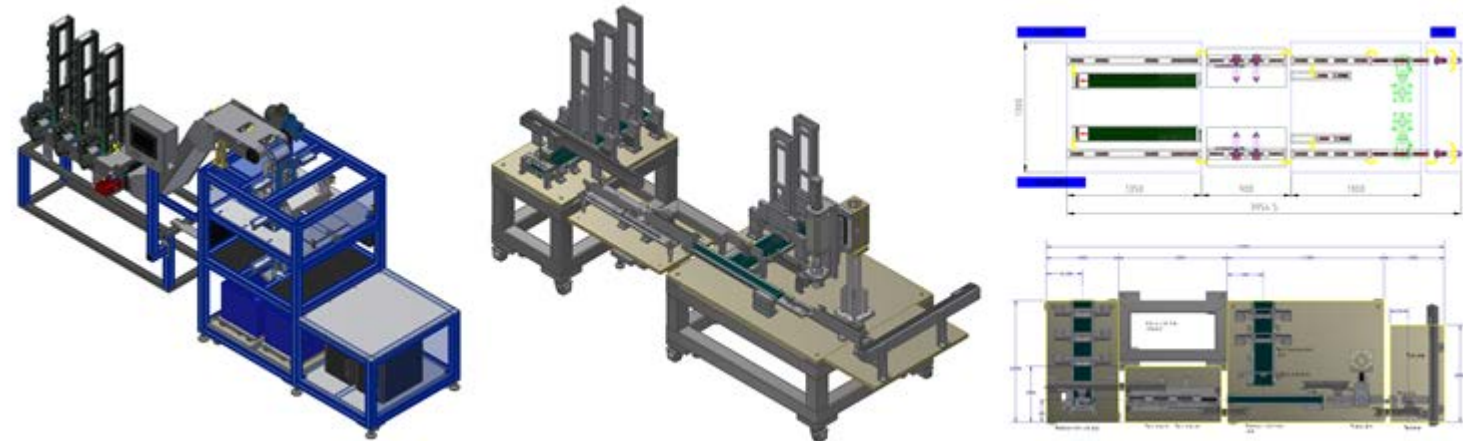
Product: STERPACK®

Productivity: 10 ppm, Dimensions: 3.8 m x 1.8 m x 1.9 m, 6.0 m x 1.7 m x 1.9 m



Product: STERLOAD®

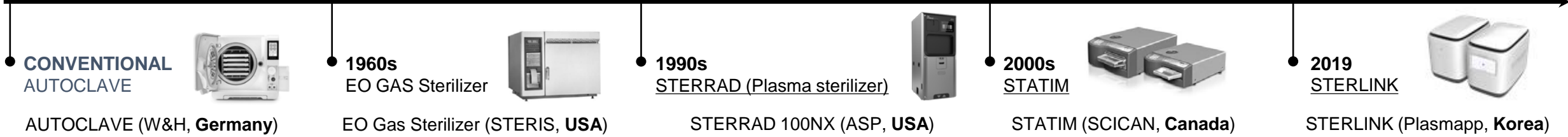
Productivity: 10 ppm, Dimension: 3.8 m x 1.8 x 1.9 m, 3.3 m x 1.0 m x 2.1 m



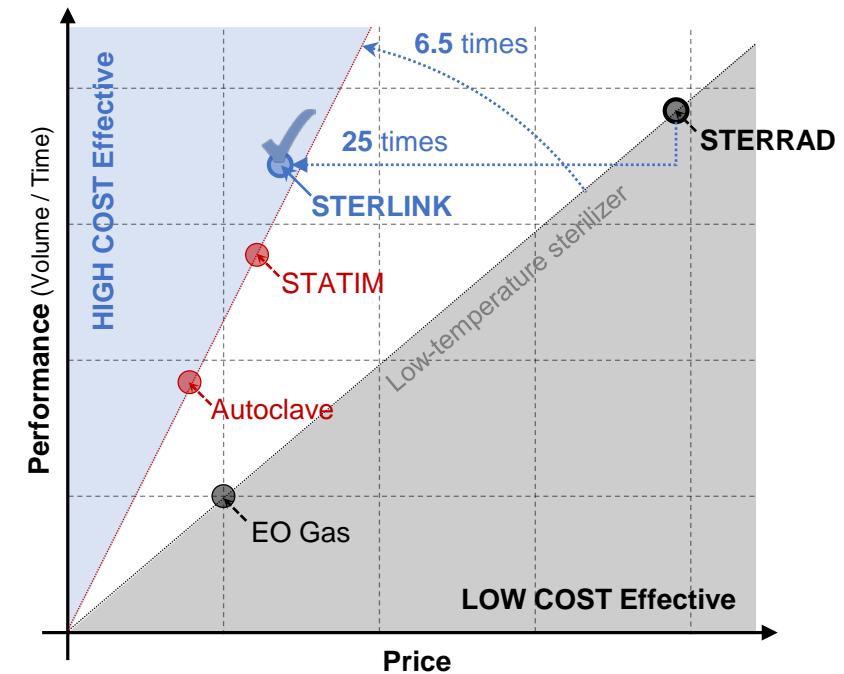
*The Factories are **QMS (GMP, ISO 13485, and MDSAP)** Certified.

A1 Plasma Sterilization

STERLINK®, 6.5 times **Cost Effective** and 25 times more **Economical**



		Autoclave	STATIM	EO Gas	STERRAD	STERLINK
Performance	Cycle time [min]	1.5	0.3	10.0	1.0	0.3
	Volume [Liter]	20	5	30	100	7
	Volume / Time	13.3	16.7	3.0	100.0	23.3
Price [USD 1K]		6	8	7	250	9
Cost effectiveness (Performance / Price)		2.2	2.1	0.4	0.4	2.6
Temperature [°C]		134			55	



A1 Plasma Sterilization

10 times **Faster** with **Direct-Injection Sterile Package, STERPACK®**

CONVENTIONAL AUTOCLAVE

1960s EO GAS Sterilizer

1990s STERRAD (Plasma sterilizer)

2000s STATIM

2018 STERPACK® (7 MIN Sterilization)

Brand: STERLINK®

COMPACT Sterilizer System with STERPACK Mode Sterilization Cycle Mode

Brand: STERPACK®

7 Min Low-Temp. Sterilization ONLY Available with STERPACK



STERLINK MINI



STERLINK FPS



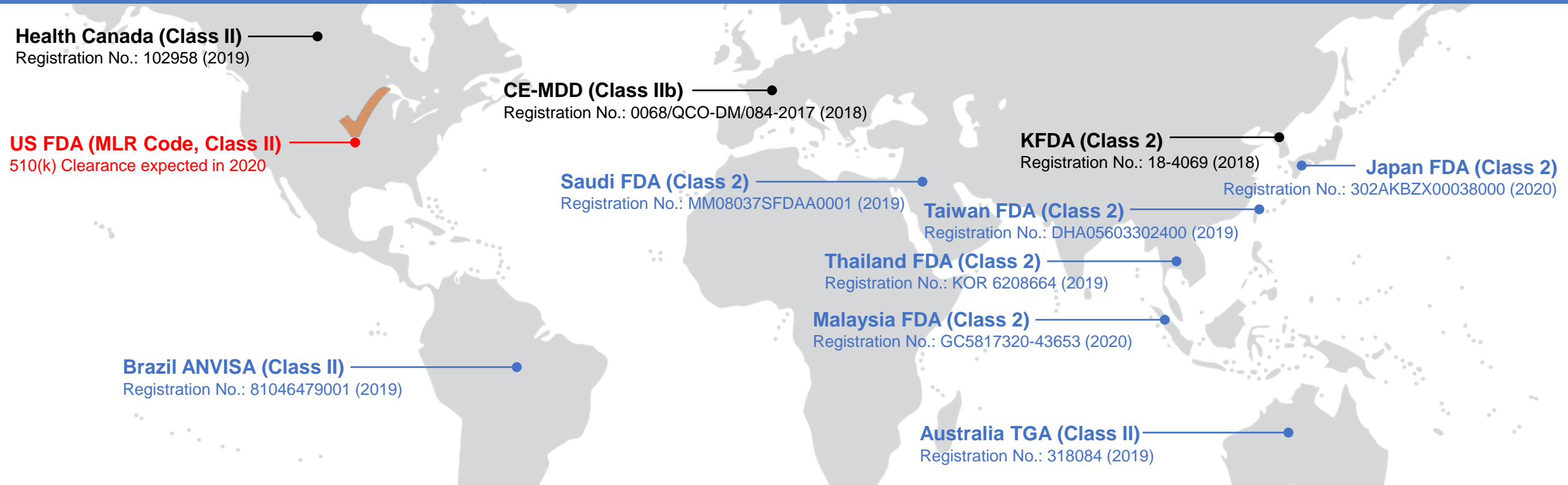
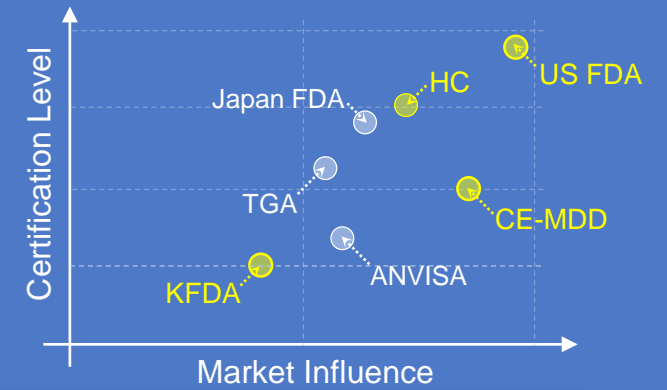
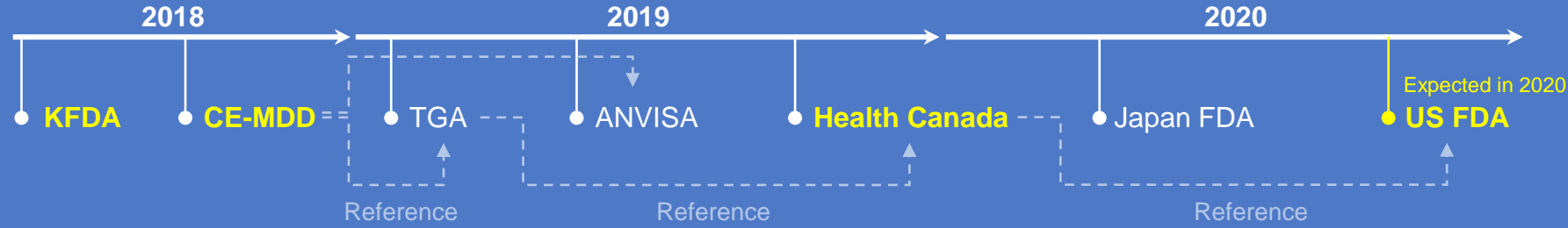
STERLINK ENDO



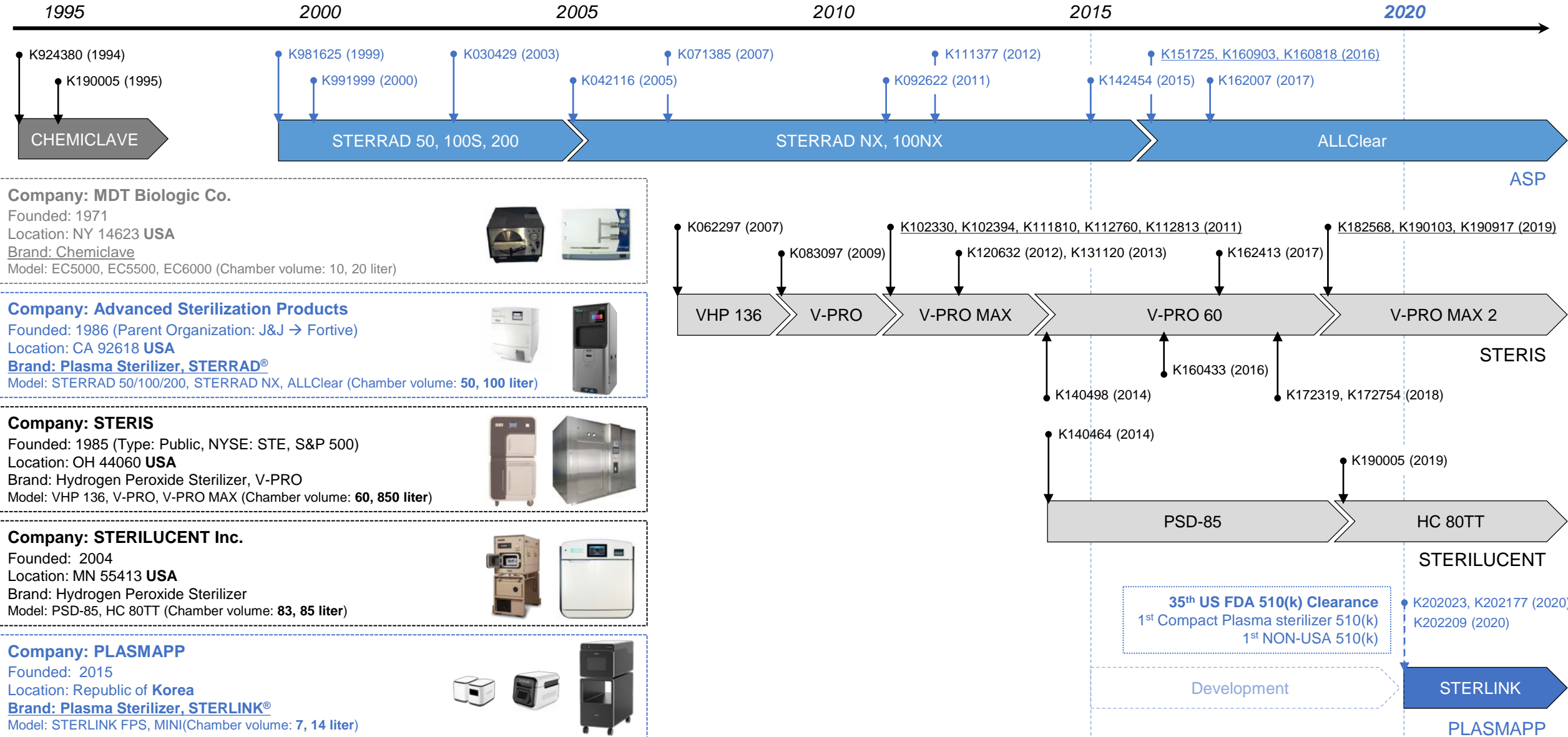
(TAM: 30B USD/year, CAGR: 5.7%)

(TAM: 6B USD/year, CAGR: 7.3%)


CERTIFICATION of Global Medical Device, STERLINK




Application No.1 – Plasma Sterilization




Company: MDT Biologic Co.
 Founded: 1971
 Location: NY 14623 USA
 Brand: Chemiclave
 Model: EC5000, EC5500, EC6000 (Chamber volume: 10, 20 liter)



Company: Advanced Sterilization Products
 Founded: 1986 (Parent Organization: J&J → Fortive)
 Location: CA 92618 USA
 Brand: Plasma Sterilizer, STERRAD®
 Model: STERRAD 50/100/200, STERRAD NX, ALLClear (Chamber volume: 50, 100 liter)



Company: STERIS
 Founded: 1985 (Type: Public, NYSE: STE, S&P 500)
 Location: OH 44060 USA
 Brand: Hydrogen Peroxide Sterilizer, V-PRO
 Model: VHP 136, V-PRO, V-PRO MAX (Chamber volume: 60, 850 liter)



Company: STERILUCENT Inc.
 Founded: 2004
 Location: MN 55413 USA
 Brand: Hydrogen Peroxide Sterilizer
 Model: PSD-85, HC 80TT (Chamber volume: 83, 85 liter)

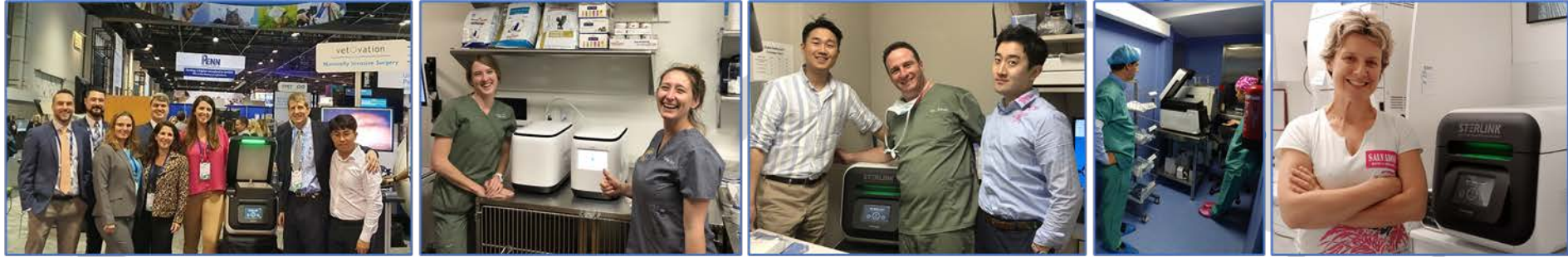
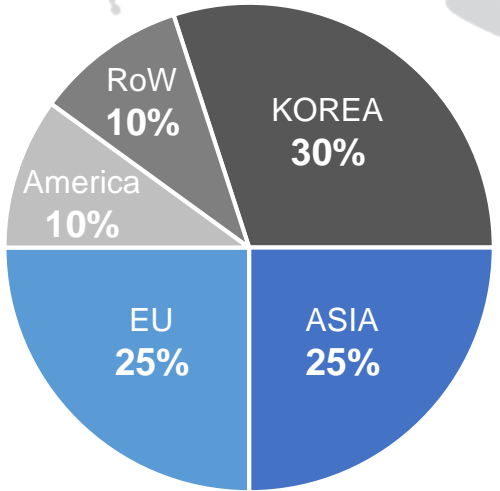
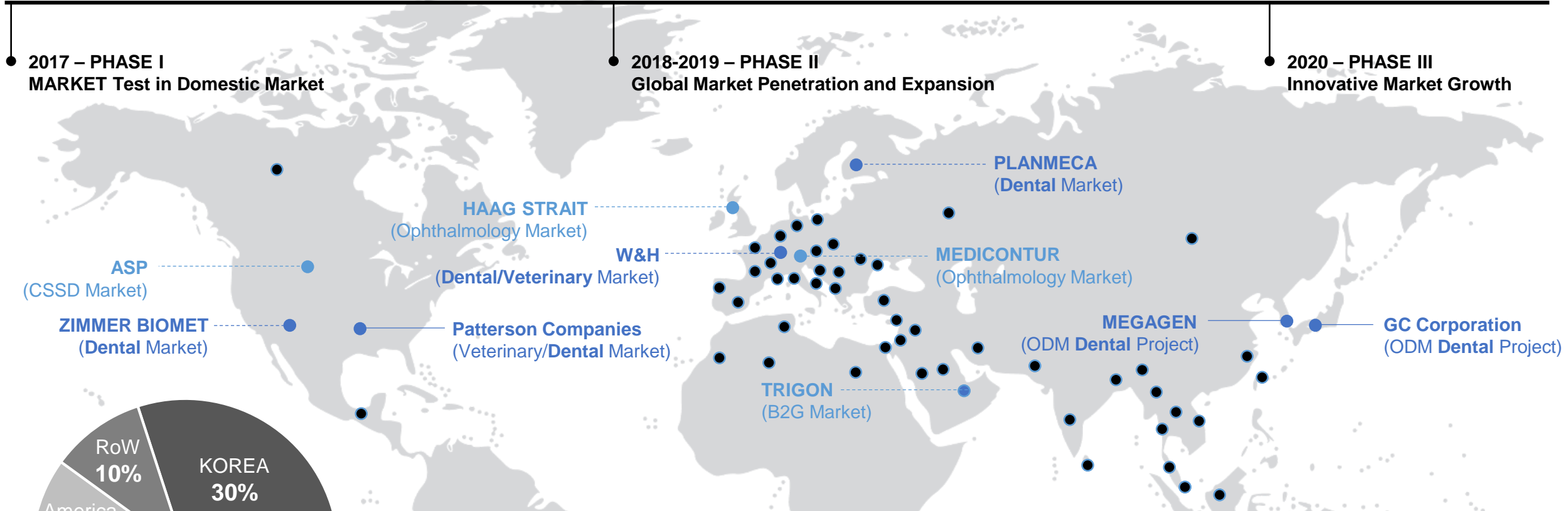


Company: PLASMAPP
 Founded: 2015
 Location: Republic of Korea
 Brand: Plasma Sterilizer, STERLINK®
 Model: STERLINK FPS, MINI (Chamber volume: 7, 14 liter)



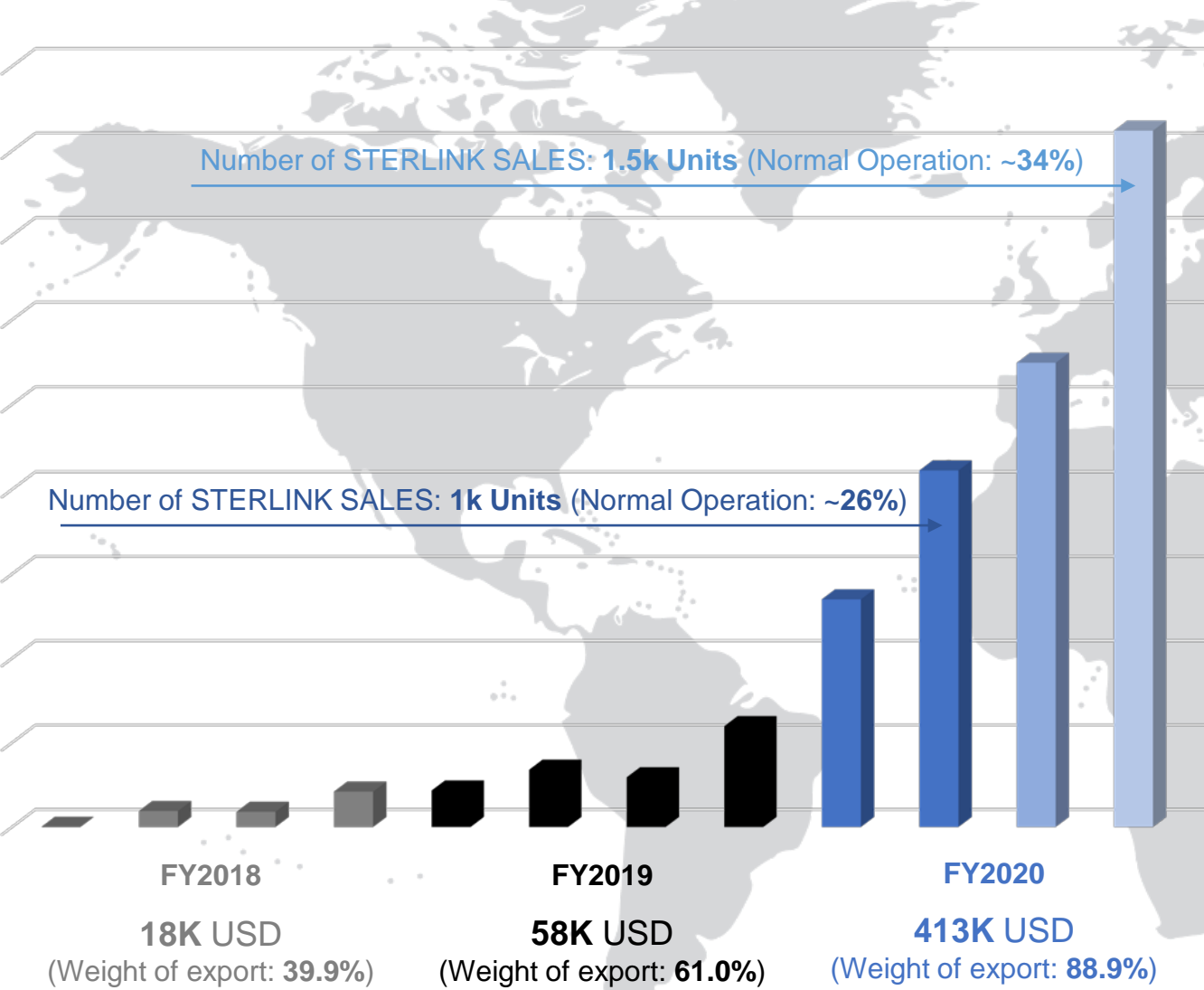
Application No.1 – Plasma Sterilization

MARKET EXPANSION



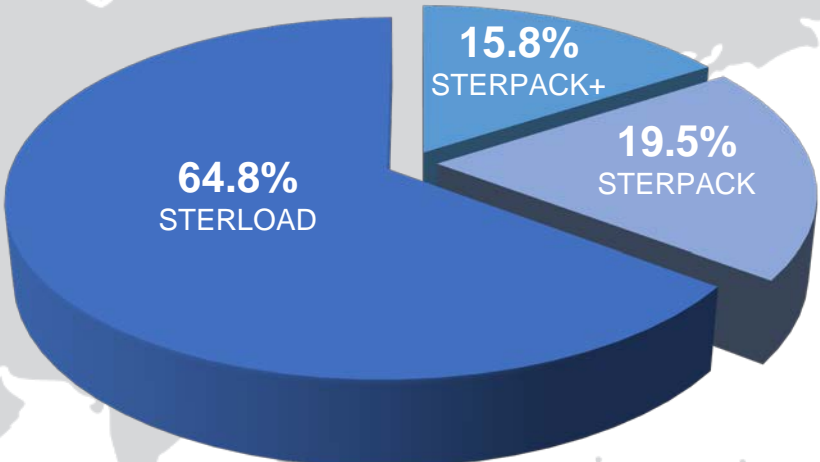
Strong Global Sales Channels in Europe and Asia Market Expanding to America and Other Market

Sterilizer Consumables CAGR (2018-2020): 412%

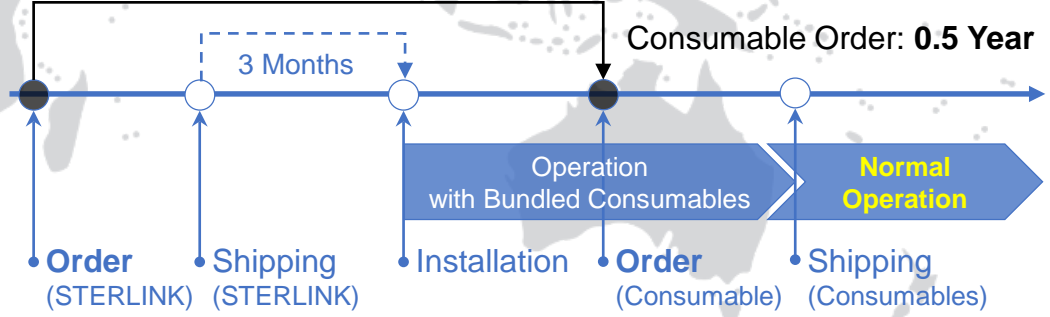


CONSUMABLES

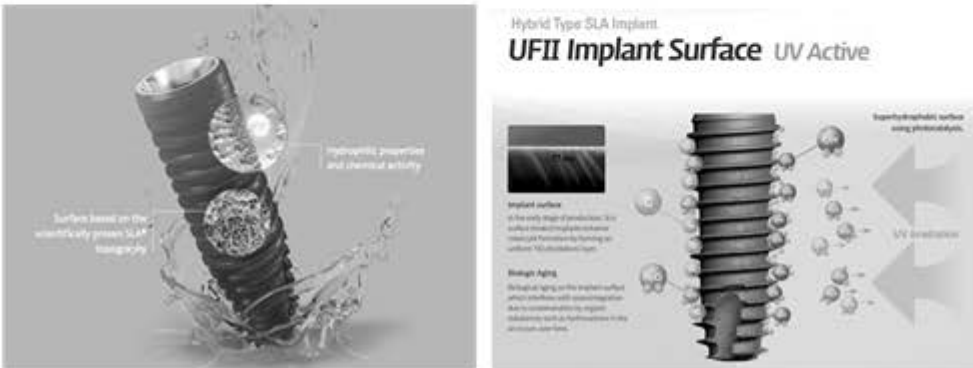
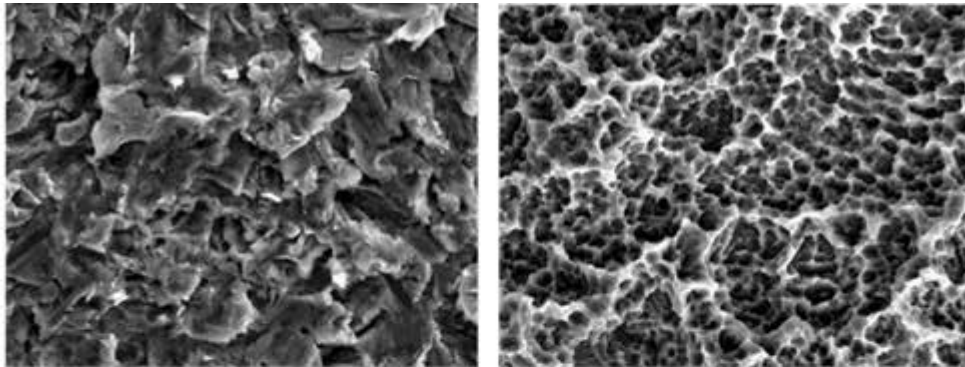
- STERLOAD for Conventional Sterilization Cycle
- STERPAK of 7 Min Fast Sterilization Cycle for Emergency Cases
- STERPACK Plus of 14 Min Sterilization for Vacuum Preservation



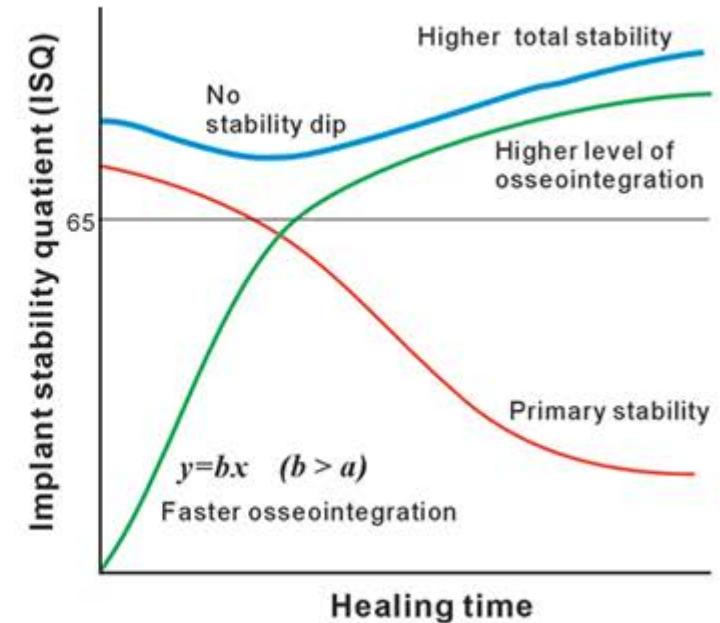
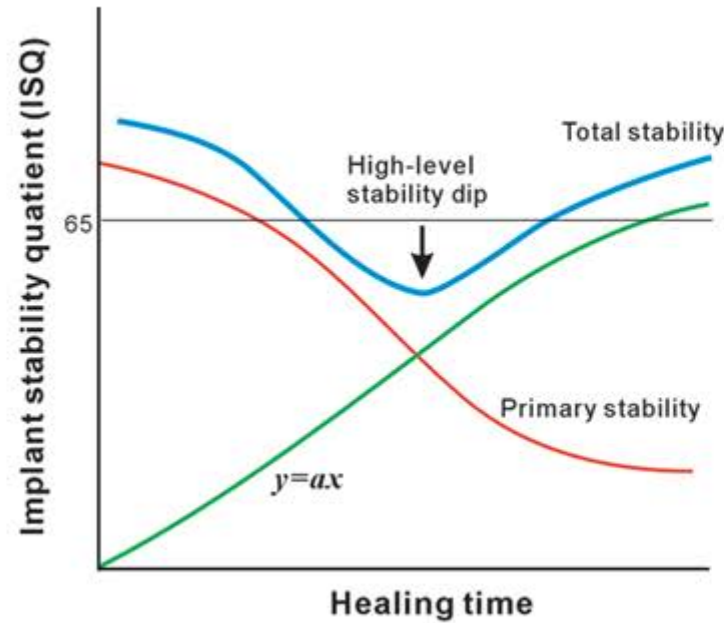
INFRASTRUCTURE (Sales – Shipping – Installation – Operation)



A2 Plasma Surface Treatment



Higher Osseointegration performance with Higher Survival Rate



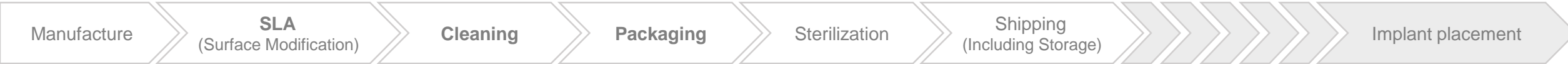
IMPLANT DENTISTRY / VOLUME 22, NUMBER 5 2013 (ISSN 1056-6163/13/02205-481)

A2 Plasma Surface Treatment

Simplified Manufacturing Process and Effective SPA Treatment



SLA



SLActive



UV Radiation



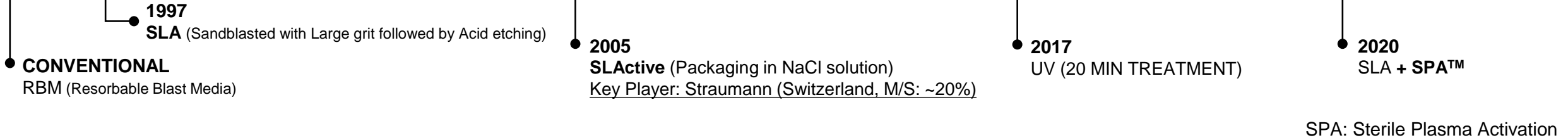
SLA+SPA



Application No.2 – Plasma Surface Treatment

A2 Plasma Surface Treatment

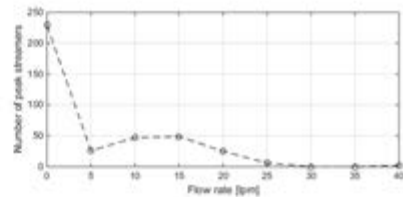
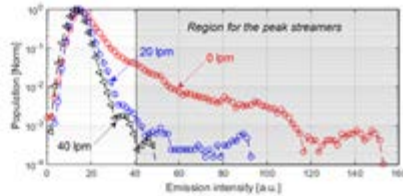
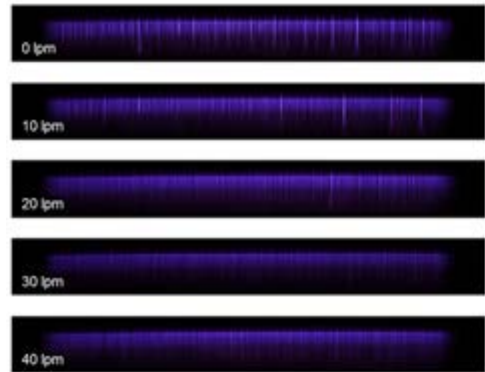
1 MIN TREATMENT, 2 times Better Performance with **SPA™** Technology



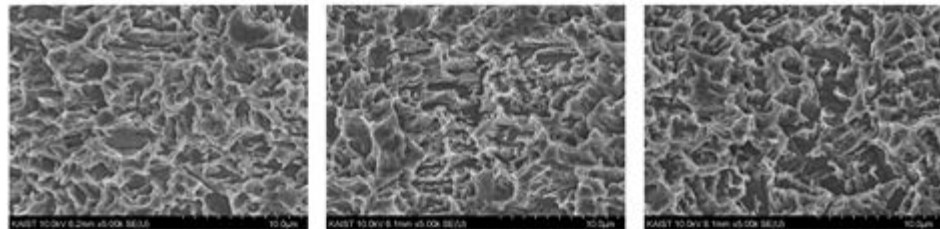
Technology originally used for Rechargeable battery

Brand: ACTILOAD™

Brand: ACTILINK™

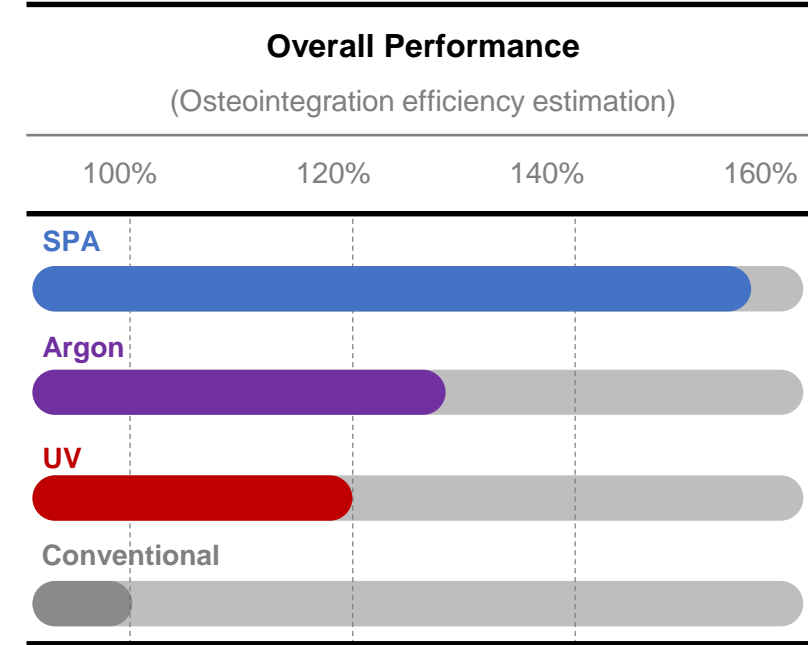


No morphology change with SPA Treatment

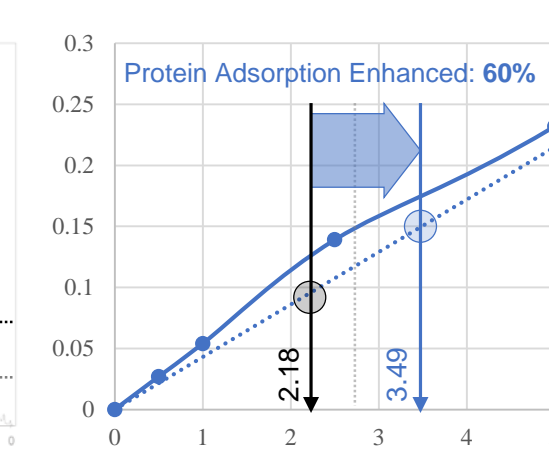
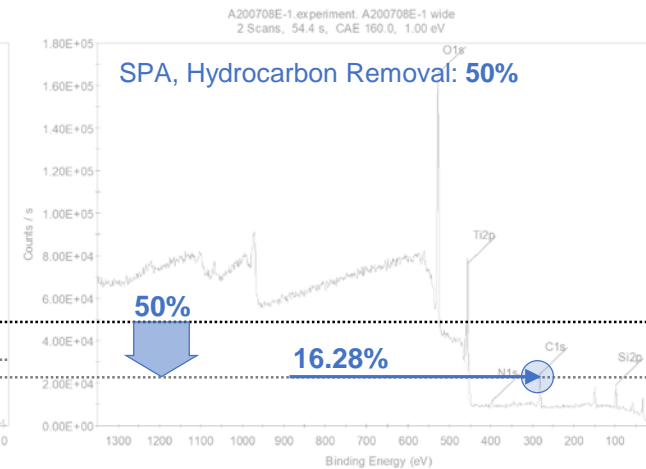
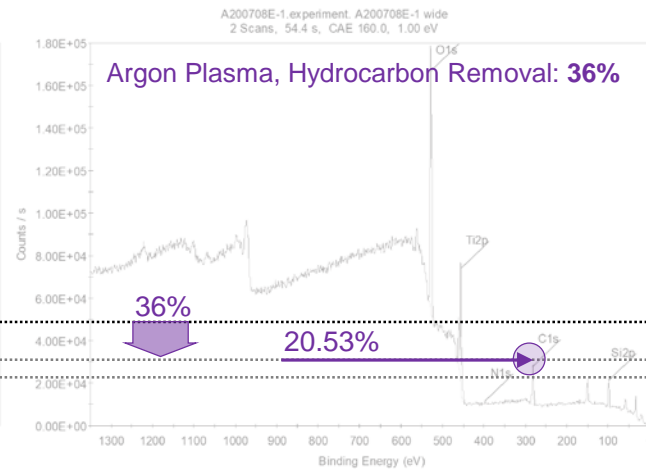
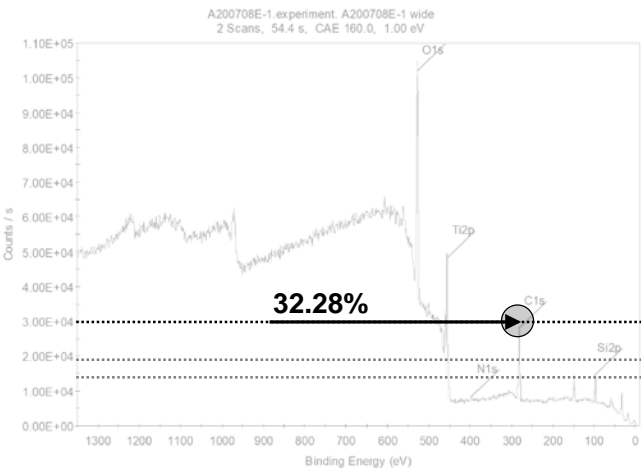


Application No.2 – VALIDATION

Treatment	Pressure [Torr]	Time [min]	Performance					
			Protein adsorption		XPS (Carbon Ratio)			Overall Performance (Enhanced %)
			Measured [microgram]	Increased Ratio [%]	Measured [%]	Decreased [%]	Decreased Ratio [%]	
SLA (Control, Sample: S-Plant)			2.18	0%	32.28	-	0%	0%
SPA (Vacuum)	1	1	3.49	60%	16.28	16.00	50%	55%
Argon plasma	760	1	2.65	22%	20.53	11.75	36%	29%
SLA (Control, Sample: Point Implant)			N.A.		21.83	-	0%	0%
UV	760	1,440	N.A.		17.55	4.28	20%	20%



Increased Ratio = Measured (Each Case) / Measured (Control), Decreased Ratio = Decreased (Each Case) / Measured (Control), Overall Performance = (Increased Ratio + Decreased Ratio)/2



SPA Technology has been validated with Better Protein Adsorption and Reduced Hydrocarbon

Plasma Sterilization

Capital



Brand: STERLINK®

Model: FPS-15, MINI (ODM Model: GC-STERLINK)

Key differentiators: Compact Design, Optimized for small clinics

Consumables



Brand: STERPACK®

Model: STERPACK, STERPACK Plus

Key differentiators: Super-fast, 7&14 Min low-temperature cycle

Software



Service: ITS™

Name: Instrument Tracking Service

Key differentiators: OQ Server for user convenience / Compliance

Plasma Surface Treatment

Capital



Brand: LJPS®

Model: LJPS-350SF, LJPS-650DF

Key differentiators: Stable plasma treatment for delicate thin film



Brand: ACTILINK™

Model: ACTILINK-DUO

Key differentiators: Sterile vacuum plasma treatment



Brand: LINK SYSTEM

Key differentiators: Plasma sterilization and surface treatment

Consumables



Brand: ACTILOAD™

Technology Trademark: SLA+SPA

Key differentiator: 2 Times better performance in 1 Min Treatment

Business Model

- Installation rate of STERLINK is globally accelerated to support razor / razor blade model with proprietary consumables including new sterile packaging of STERPACK.
- STERLINK is targeting more numbers of specialty clinics in global medical market with economic benefits.
- Plasma technologies of Plasmapp will open various market including current business in rechargeable battery market.

Projection (Plasma Sterilization Business)

		2019	2020	2021	IPO ✓ 2022	UNICON ✓ 2023
Revenue	Capital	24.0	55.4	106.5	179.7	286.2
	Consumables	0.6	25% 20.2	32% 53.8	35% 104.5	38% 188.4
	Others	0.8	4.4	9.7	15.8	25.4
	Total	25.4	80.0	170.0	300.0	500.0
Profit	Gross	0.5	25.3	63.9	120.9	218.1
		1.9%	31.6%	37.6%	40.3%	43.6%
	Net	-62	-18.0	8.2	32.4	78.2
		-244.0%	-22.5%	4.8%	10.8%	15.6%



Plasmapp technology enables
Plasma Sterilization and Treatment for Medical application
Faster, more Affordable and Reliable
than any other companies in the world.

Dr. Youbong Lim, CEO of Plasmapp Co., Ltd.

Contact: ceo@plasmapp.co.kr



Plasmapp

TECHNOLOGY

✓ **90 PATENTS** Applications (37 Registered)

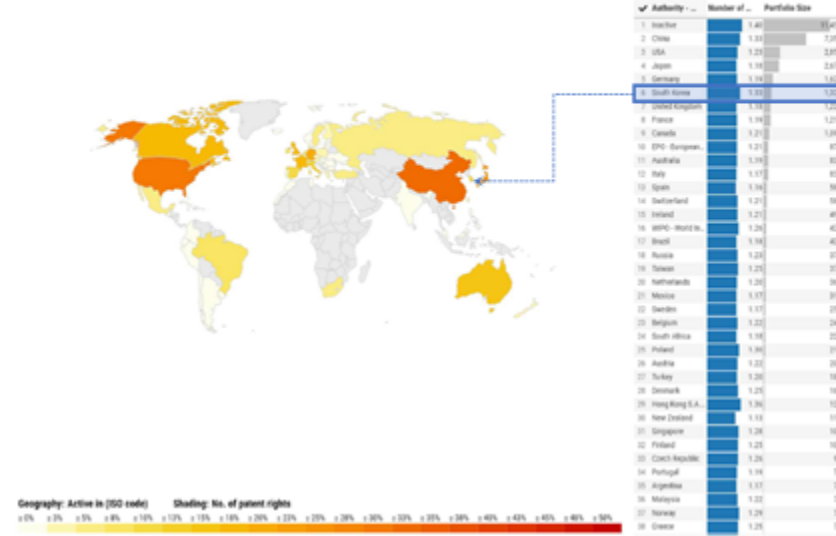
- PCTs and Global Applications (US, Europe, Japan, China)

✓ **TCG (Technology Competitiveness Grad): AA**

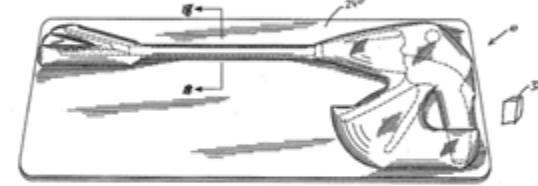
- 18 Patents were analyzed out of 47 Patents on Aug. 2018

기술 경쟁력 등급	AA	2018-08-01 현재, 주식회사 플라즈맵의 기술경쟁력은 상위0.3% ~ 0.5%로 평가됩니다. 등급기준																										
		<table border="1"> <tr> <td>AAA</td> <td>AA+</td> <td>AA</td> <td>AA-</td> <td>A+</td> <td>A</td> <td>A-</td> <td>B+</td> <td>B</td> <td>B-</td> <td>C+</td> <td>C</td> <td>C-</td> </tr> <tr> <td>상위 0.1% 이내</td> <td>-0.3%</td> <td>-0.5%</td> <td>-1%</td> <td>-3%</td> <td>-5%</td> <td>-10%</td> <td>-20%</td> <td>-30%</td> <td>-40%</td> <td>-50%</td> <td>-60%</td> <td>그 외</td> </tr> </table>	AAA	AA+	AA	AA-	A+	A	A-	B+	B	B-	C+	C	C-	상위 0.1% 이내	-0.3%	-0.5%	-1%	-3%	-5%	-10%	-20%	-30%	-40%	-50%	-60%	그 외
AAA	AA+	AA	AA-	A+	A	A-	B+	B	B-	C+	C	C-																
상위 0.1% 이내	-0.3%	-0.5%	-1%	-3%	-5%	-10%	-20%	-30%	-40%	-50%	-60%	그 외																
보유특허 자산가치	50.2 억원	[현재 보유 특허] 한국등록특허 18건, 해외등록특허 1건 - 국내 등록 특허와 해외에 출원한 특허의 가치를 종합하여 평가한 금액입니다. 해외 특허는 등록특허의 가치와 해당국의 등록비용을 고려하여 산출됩니다.																										
기업가치 추정	642.1 억원	주식회사 바이오솔루션이 보유한 기술력과 동종업계 상장사의 평균적인 PTR을 비교하여 추정한 현재기업가치입니다. 유사기술을 보유한 상장사들의 PTR 지수를 벤치마킹하여 산출됩니다. - PTR (Price Technology Ratio) = 시가총액 / 특허의 가치 - 기업의 단위 기술당 주가를 의미합니다. 수치가 높을 수록 단위기술이 높게 평가되고 있음을 의미합니다. - (벤치마크 기업) 맥아이씨에스, 웅니시스템, 하이로닉, 오스테오닉, 루트로닉, 셀바스헬스케어, 로고스바이오, 이디, 피에스텍...																										
업계 성장률	6.35 %																											
주요 경쟁사		<table border="0"> <tr> <td>(주)한빛연디</td> <td>(주)케이아이웍스</td> <td>(주)엔스리텍</td> <td>(주)하나우메디칼</td> </tr> <tr> <td>(주)비전메카텍</td> <td>(주)비씨엠코리아</td> <td>(주)마르놀코리아</td> <td>(주)덴탈비</td> </tr> <tr> <td>에이엠테크놀로지(주)</td> <td>한국바이오기술공사(주)</td> <td></td> <td></td> </tr> </table>	(주)한빛연디	(주)케이아이웍스	(주)엔스리텍	(주)하나우메디칼	(주)비전메카텍	(주)비씨엠코리아	(주)마르놀코리아	(주)덴탈비	에이엠테크놀로지(주)	한국바이오기술공사(주)																
(주)한빛연디	(주)케이아이웍스	(주)엔스리텍	(주)하나우메디칼																									
(주)비전메카텍	(주)비씨엠코리아	(주)마르놀코리아	(주)덴탈비																									
에이엠테크놀로지(주)	한국바이오기술공사(주)																											

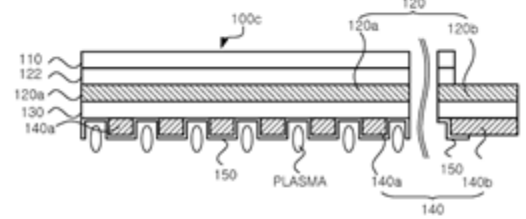
✓ **Highly Competitive Impact in Global Market**



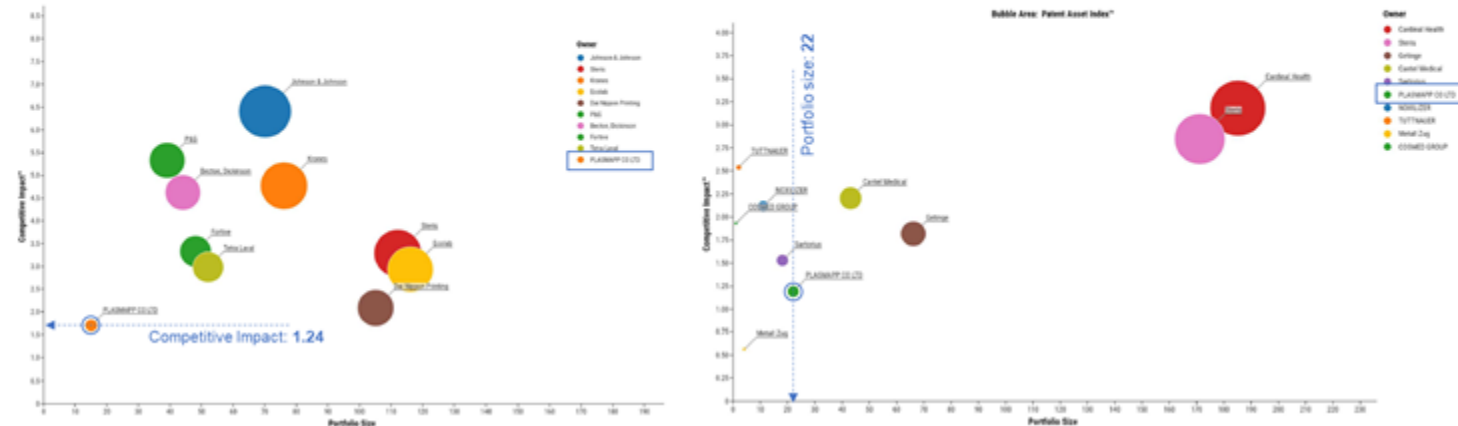
Key patent from Ethicon (Competitive impact: 34.8)
Post-sterilization programming of surgical instruments



Key patent from Plasmapp
Post-sterilization programming of surgical instruments

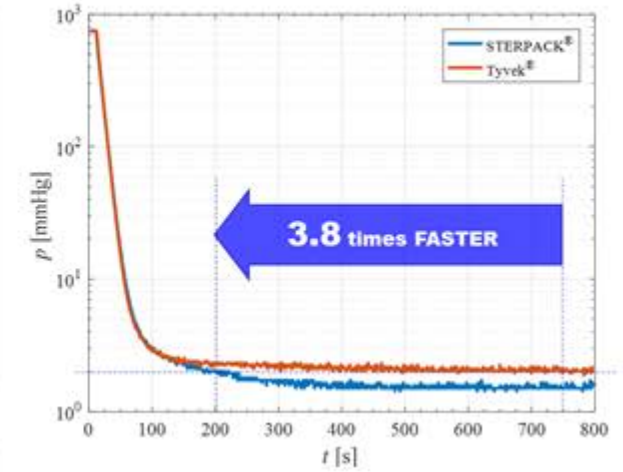
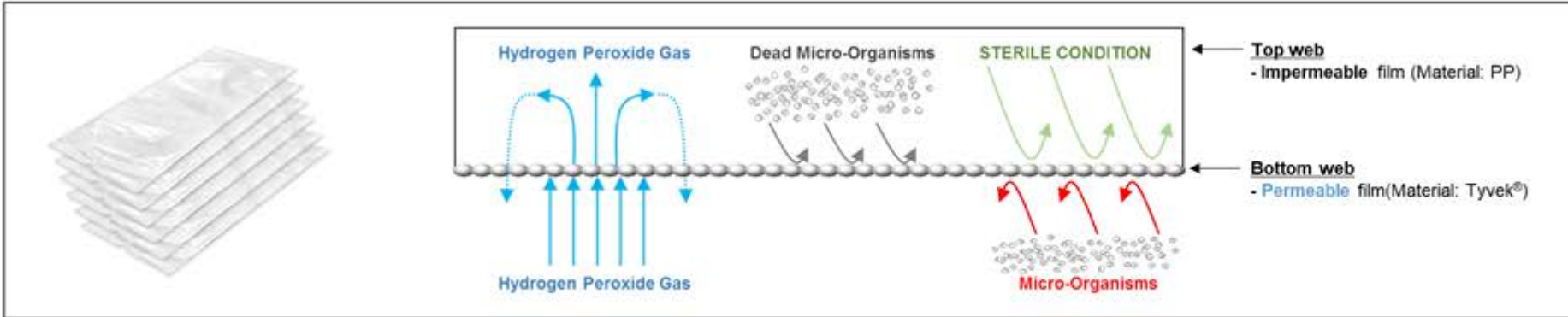


✓ **Highly Competitive Impact with Growing Portfolio Size**

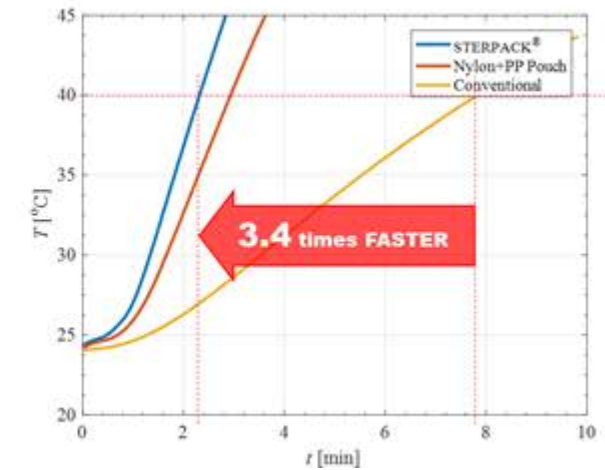
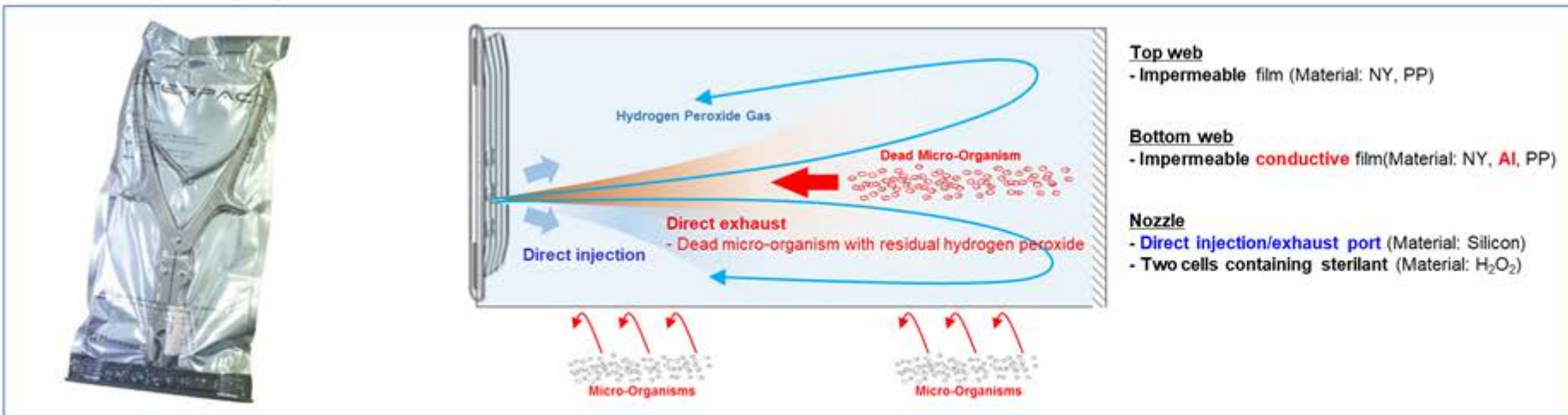


STERPACK STERILIZATION MECHANISM

Conventional packaging: Tyvek®



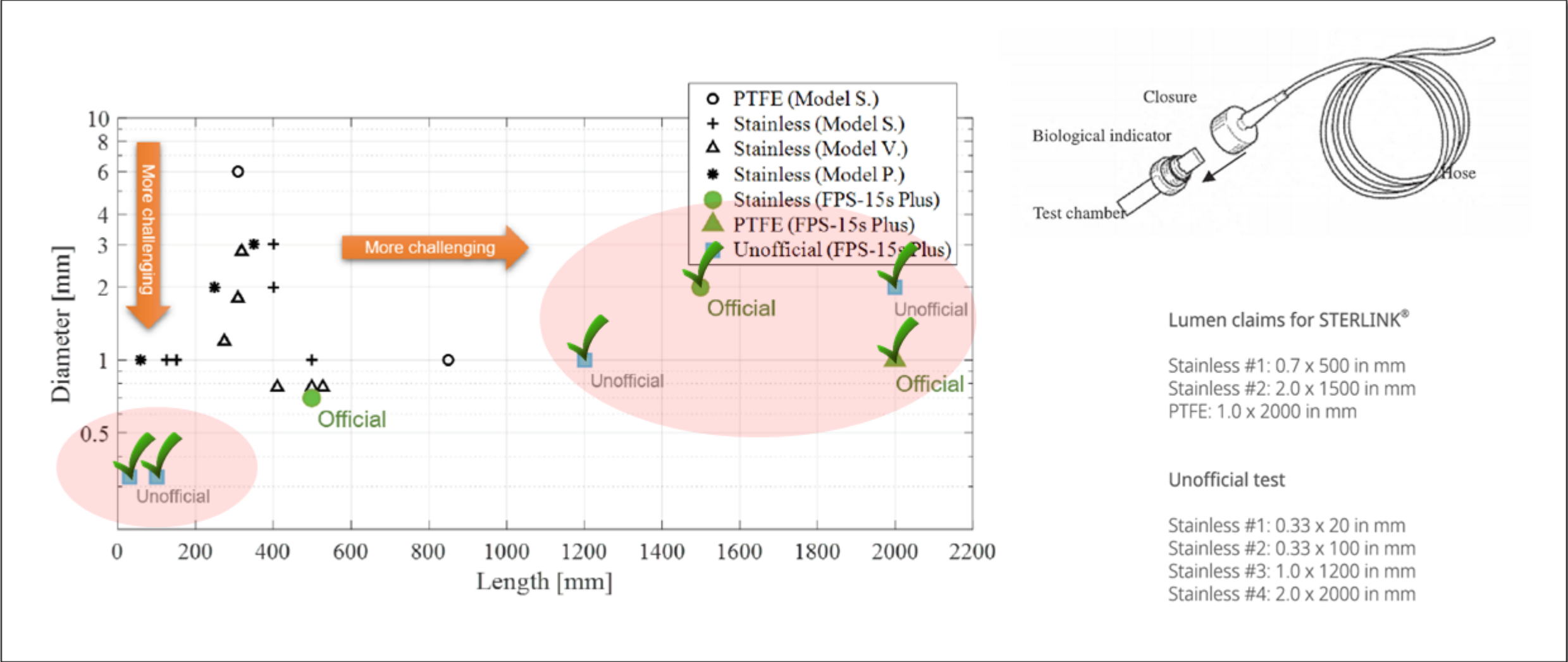
Advanced packaging: STERPACK®



STERPACK STERILIZATION PERFORMANCE

Sterilizer system of STERLINK® and STERPACK® is validated and certified to demonstrate the 4 min sterilization process.

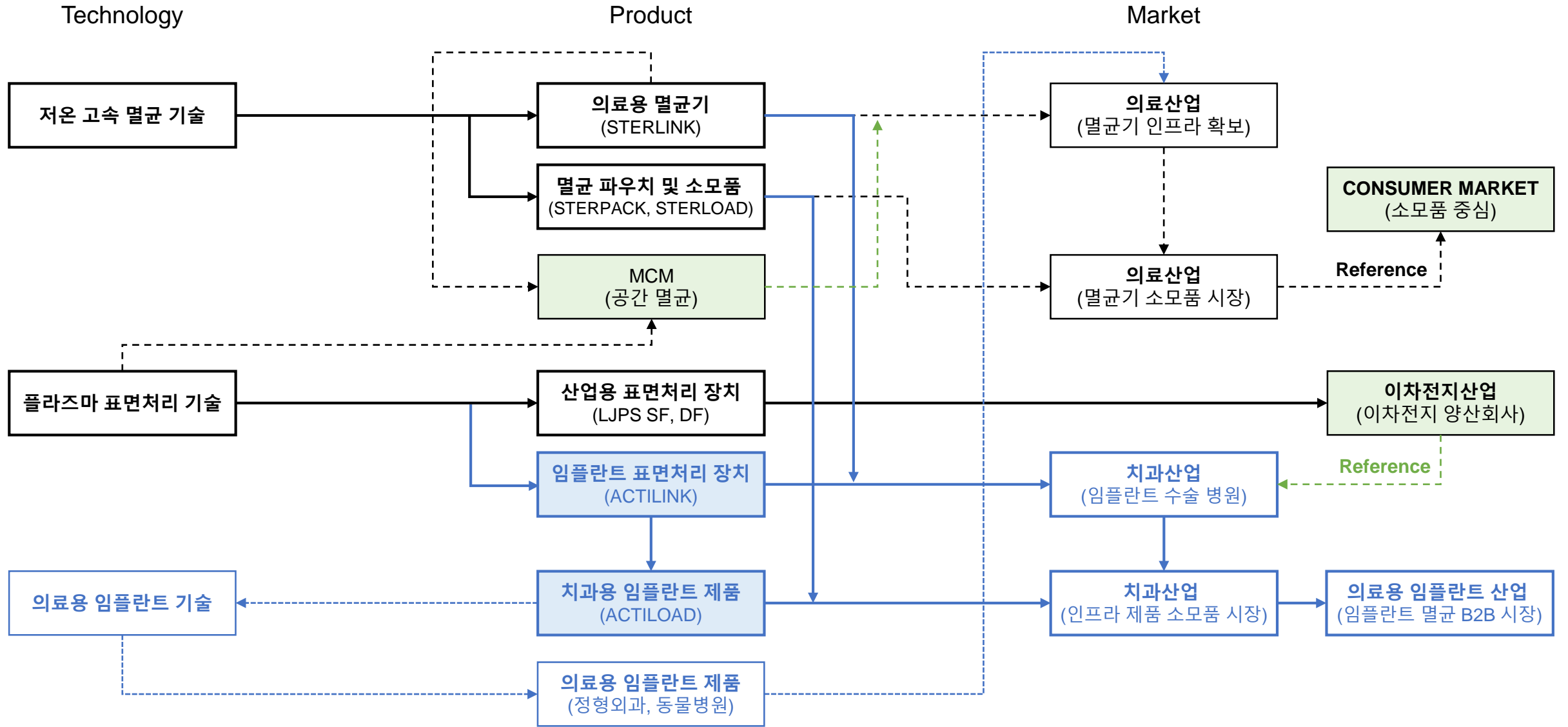
Validation for the system has been performed according to the standards provided in ISO 14937.



US FDA, 510(k) List (Code: MLR)

Company	510(K) Number	No	Product	Decision Date
ADVANCED STERILIZATION PRODUCTS	K981625	1	STERRAD 50 STERILIZER	01/11/1999
	K991999	2	STERRAD 100S STERILIZER	06/15/2000
	K030429	3	STERRAD 200 STERILIZER	08/18/2003
	K042116	4	STERRAD NX STERILIZER	04/22/2005
	K071385	5	STERRAD 100NX STERILIZER	11/29/2007
	K092622	6	STERRAD 100NX STERILIZER EXPRESS CYCLE	03/04/2011
	K111377	7	STERRAD(R) 100NX STERILIZER DUO CYCLE	09/13/2012
	K142454	8	STERRAD NX Sterilizer STERRAD 100NX Sterilizer	04/03/2015
	K151725	9	STERRAD NX Sterilizer STERRAD 100NX Sterilizer	01/13/2016
	K160903	10	STERRAD 100NX Sterilizer with ALLClear™ Technology	09/26/2016
	K160818	11	STERRAD NX Sterilizer with ALLClear Technology	09/27/2016
	K162007	12	STERRAD NX Sterilizer	02/16/2017
MDT BIOLOGIC CO.	K924380	1	MDT/HARVEY MODEL 7000 & 8000 CHEMICLAVE	02/16/1994
	K943654	2	HARVEY CHEMICLAVE EC5000 EC5500 EC6000 STERILIZERS	08/02/1995
STERILUCENT INC	K140464	1	STERILUCENT PSD-85 HYDROGEN PEROXIDE STERILIZER	10/31/2014
	K190005	2	Sterilucent HC 80TT Hydrogen Peroxide Sterilizer	09/13/2019
STERIS Corporation	K062297	1	VHP 136 LOW TEMPERATURE STERILIZATION SYSTEM	10/04/2007
	K083097	2	AMSCO V-PRO 1 LOW TEMPERATURE STERILIZATION SYSTEM	08/03/2009
	K102330	3	AMSCO V-PRO MAX LOW TEMPERATURE STERILIZATION SYSTEM	08/12/2011
	K102394	4	AMSCO V-PRO 1 LOW TEMPERATURE STERILIZATION SYSTEM; AMSCO V-PRO 1 PLUS	08/18/2011
	K111810	5	AMSCO V-PRO 1 AND V-PRO 1 PLUS LOW TEMPERATURE STERILIZATION UNITS	09/02/2011
	K112760	6	AMSCO V-PRO MAX LOW TEMPERATURE STERILIZATION SYSTEM	11/22/2011
	K112813	7	AMSCO V-PRO	12/01/2011
	K120632	8	AMSCO V-PRO 1 LOW/PLUS/MAX TEMPERATURE STERILIZATION SYSTEM	06/26/2012
	K131120	9	AMSCO V-PRO 1 LOW V-PRO 1 PLUS V-PRO MAX LOW TEMPERATURE STERILIZATION SYSTEM	07/16/2013
	K140498	10	V-PRO 60 LOW TEMPERATURE STERILIZATION SYSTEM	07/24/2014
	K160433	11	V-PRO 1 Plus and V-PRO maX Low Temperature	07/06/2016
	K162413	12	AMSCO V-PRO 1 Low Temperature Sterilization System / V-PRO 60 Low Temperature Sterilization System	03/31/2017
	K172319	13	AMSCO V-PRO 1 Low Temperature Sterilization System / V-PRO 60 Low Temperature Sterilization System	01/18/2018
	K172754	14	V-PRO maX 2 Low Temperature Sterilization System	02/09/2018
	K182568	15	V-PRO s2 Low Temperature Sterilization System V-PRO 60 Low Temperature Sterilization System	01/03/2019
	K190103	16	V-PRO maX 2 Low Temperature Sterilization System / V-PRO 1 Low Temperature Sterilization System	04/05/2019
	K190917	17	V-PRO 60 a Low Temperature Sterilization Systems V-PRO s2 Low Temperature Sterilization Systems	05/09/2019
ZIMMER INC.	K972774	1	GAS PLASMA STERILIZATION (ASP ODM)	05/05/1999

TECHNOLOGY / PRODUCT / MARKET



전체 사업 구성 및 연계도

감염보호 단계

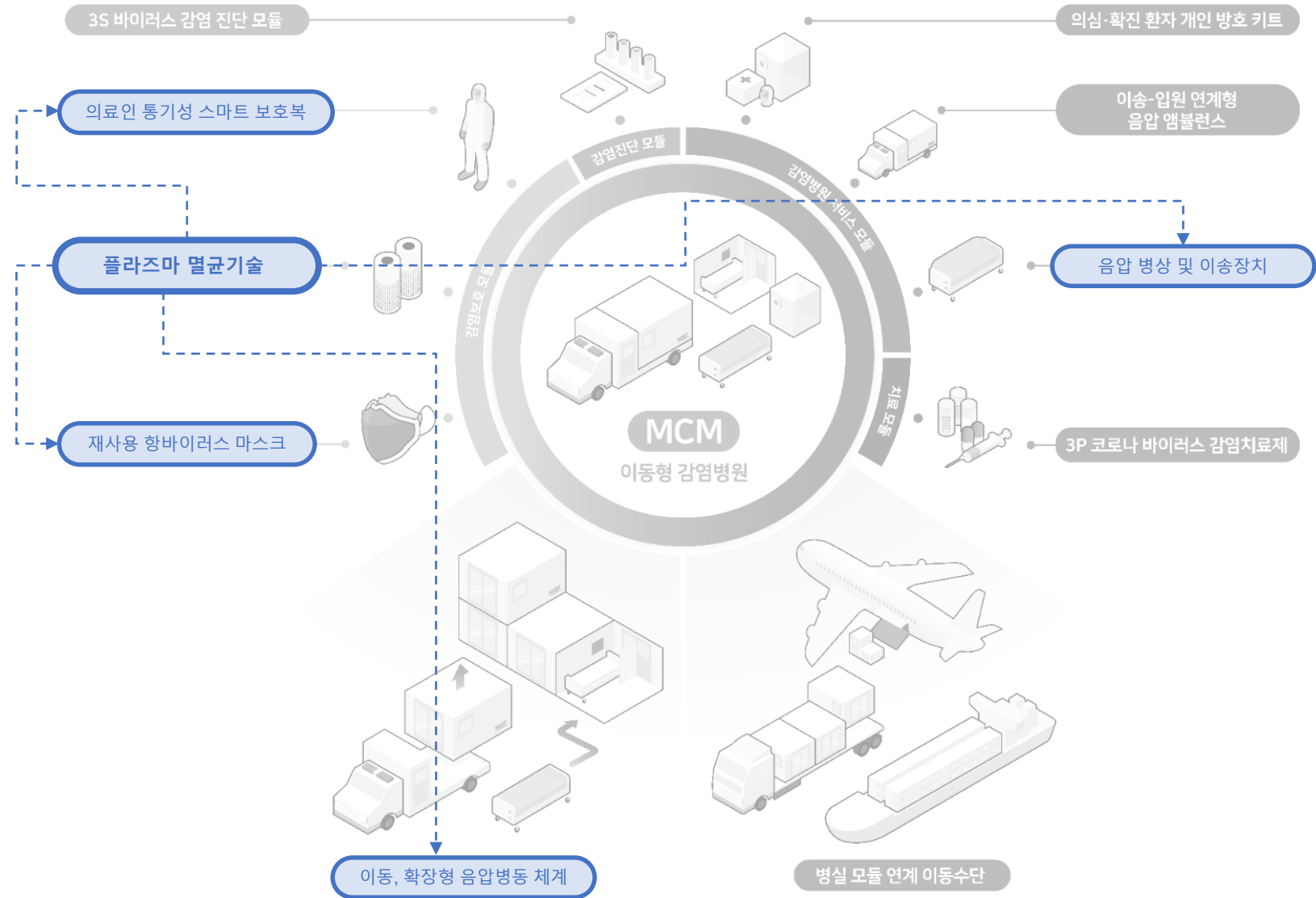
일상 모니터링과 방역을 위한 감염보호와 진단 모듈
(Pre-MCM)

응급대응 단계

감염·응급·재난 현장 특화 이동형 감염병원
(MCM; Mobile Clinic Module)

치료복구 단계

병원이동후 치료 모듈
(Post-MCM)



추진사업 개발 결과물 및 적용 단계

개발 결과물	대상	단계
A01. 플라즈마 공간 살균기	앰블런스 내부 및 환자 이송장치	1
	음압병실 내부 및 의료기기	3
A02. 의료용 저온 플라즈마 멸균기	의료기기, 개인 보호구 및 방호키트	2

