This presentation covers the following:

- Company Overview
- Product Portfolio
- Target Segments for Applications
- Marketing Channels (Conferences/Expos/Etc)
WE AIM FOR BRIGHT FUTURE
Table of Contents

1. Company Profile
2. violeds Technology
3. violeds Products
4. Total Solution for UV LED
01 We do not compete with our customers

02 We provide differentiated value to our customers

03 We provide our customer one stop shopping

04 We are the most reliable company

05 We protect our customers from IP copy companies
Company Overview

For 26 years, Focused Only on Compound Semiconductor(LED) Biz

1. Overview

<table>
<thead>
<tr>
<th></th>
<th>SSC</th>
<th>SVC/SETi</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established in</td>
<td>1992</td>
<td>2002</td>
<td></td>
</tr>
<tr>
<td>Revenue</td>
<td>1.1 B USD</td>
<td>0.4 B USD</td>
<td>1992</td>
</tr>
<tr>
<td>No of Employees</td>
<td>2,150</td>
<td>890</td>
<td></td>
</tr>
</tbody>
</table>

2. M/S on Compound Semiconductor

- UV LED Global No. 1 (2018, LED Inside)
- LED Global No. 4 (2018, IHS Report)

*World 2nd if Captive market excluded*

3. Patent and Technology

- Owns about 12,000 patents
- Prof. Shuji Nakamura has been serving as a chief consultant for 11 years (2014 Novel Prize)

4. Growth History ('03 ~ '14)

Capacity:
Over 2 B chips/month
UV portion growing from 2014

5. Vision

World Top UV LED
46% MS by 2019

SSC: Seoul semiconductor,
SVC: Seoul Viosys
Global Network

4 Production Platforms, 6 R&D Labs

- USA
  - Land Area: 22,986 m²
  - Floor Area: 3,645 m²

- China
  - Land Area: 14,170 m²
  - Floor Area: 11,106 m²

- Vietnam
  - Land Area: 123,932 m²
  - Floor Area: 57,077 m²

- Korea
  - Land Area: 21,485 m²
  - Floor Area: 71,395 m²
Business Segments

Select & Focus on 5 Segments Related to LEDs

**Lighting**
- Compact Design
- Energy Savings
- Custom Modules

**Blu & Mobile**
- Slim Design
- Excellent Image Quality
- Custom Modules

**Automotive**
- High Reliability
- Custom Color
- Custom Modules

**U V**
- Full range wavelength
- World 1st UVB/C
- Various applications

**N B**
- Micro LED
- IR / VCSEL
- Sensor Module

Acrich  WICOP  3030
Nano&Micro Driver  SunLike  COB

WICOP  0.3T/0.4T  7020  Flash  IR

WICOP  3030  nPola  1608  825

Z5  AAP  CA3535

R3030  R3528  Sensor Module

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UV Business History

Over 15 years investment & R&D for world top UV LED company

“From Visible & UV Chip Maker to UV Total Solutions Provider”

1992
SEOUl SEMICOneDUTOR
Establishment

2002
Investment

2005
Investment & Joint Development

2008
RF Device development & Applied Missiles (SETI)

2013
Expansion of Technology Application

2014
Acquisition Approved by the US Department of Defense

2015
UV LED M/S No. 1

2016

2017
Finished products Launching

2018

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Seoul Viosys (SVC) Value Proposition

- No. 1 Patent Power
- Honest Spec
  - Exact Tolerance and Power, Superior Performance
- Stable Supply and On Time Delivery
- Solution Provider
  - Has own laboratory
  - Offer Solution and Technical Guidance
- Excellent Response
- Quality Control
- Patent Power technology
UV Light & UV LED?

UV LED is Smart Functional Light

UV Light

<table>
<thead>
<tr>
<th>Wavelength Spectrum</th>
<th>λ-ray</th>
<th>X-ray</th>
<th>Ultra Violet</th>
<th>Visible</th>
<th>Infrared</th>
<th>Micro Wave</th>
<th>Radio Wave</th>
</tr>
</thead>
</table>

- **UVC**
  - (0%)
  - No Ozone
  - No Chemicals and Harmful reactant

- **UVB**
  - (0.5~10%)
  - Oxidation

- **UVA**
  - (90%)
  - Reduction

UV Application

- No Chemicals and Harmful reactant
- Energy Saving
- Available for various applications
What is **violeds** technology?

**violeds technology** eliminates the drawbacks of UV and is a technology optimized for clean environment and health.

1. **Diamond in rough**
2. **Diamond**
3. **State-of-the-art technology used in International Space Station**
Technology Application of violeds

violeds Technology expands from Industry application to Bio application

<table>
<thead>
<tr>
<th>UVA</th>
<th>UVB</th>
<th>UVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>310</td>
<td>280</td>
</tr>
<tr>
<td>200</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

- **Industry**
  - Black Light (Forensic, Entertainment, counterfeit)
  - Exposure (PCB)
  - Curing (Adhesive/Coating/Ink/Nail)

- **Home Appliance**
  - Mosquito Control
  - Tanning
  - Photocatalytic Purification

- **Bio**
  - Medical
  - Bio
  - Agriculture
  - NEW
  - Surface/Air Disinfection
  - Water Disinfection

NEW
## Chip / PKG

### Chip
- **UV 700 series**
- **UV 1000 series**
- **UV 1400 series**
- **UV 1730 series**
- **D4545 series**
- **DY9560 series**

### PKG
- **AAP series**
  - 1chip
  - 4chip
- **CA series**
  - Flat
  - Dome
- **Z5 series**
- **nZ5 series**

<table>
<thead>
<tr>
<th><strong>UVA/B</strong></th>
<th><strong>UVC</strong></th>
</tr>
</thead>
</table>

※ If you want to know more information, please check the SVC homepage (http://www.seoulviosys.com)
Lamp / COB / Sensor

✓ Lamp
- T5
- T8
- T9

✓ COB
- 9 chip
- 64 chip

✓ Industrial UV Sensor
- S2016
- S3020
- C3535
- TO18
- SUViSEN 400, 375
- Low power UV Light
- SUViSEN 400, 375, 320, 280
- High power UV Light

✓ Index UV Sensor
- S2424
- SUViSEN 320

※ If you want to know more information, please check the SVC homepage (http://www.seoulviosys.com)
Module

✔️ Standard Module

Air Deodorization & Sterilization

Surface Sterilization

Water Sterilization

✔️ Customized Module

Seoul Viosys provides exclusive technologies for a customized module at competitive price with total UV LED solution based on the vertical systematization throughout the entire production process of UV LED.

※ If you want to know more information, please check the SVC homepage (http://www.seoulviosys.com)
# SVC Product Positioning by Major Market

<table>
<thead>
<tr>
<th>Market</th>
<th>SVC Product</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curing</strong></td>
<td>[Z5 PKG] [NZ5 PKG] [CA PKG] [NCOB-9chip]</td>
<td>[Printing] [Adhesive] [(PCB) Exposure] [Nail Curing]</td>
</tr>
<tr>
<td>365nm, 385nm, 395nm, 405nm</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Air Purification/Deodorization</strong></td>
<td>[Z5 PKG] [CA PKG] [AAP PKG-1chip] [Photocatalytic Filters]</td>
<td>[Air Purifier] [Air Purifying system] [Automotive HVAC] [Refrigerator] [Air Conditioner]</td>
</tr>
<tr>
<td>365nm with Photocatalytic Filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sterilization (Water/Surface)</strong></td>
<td>[CA PKG] [AAP PKG-1chip] [AAP PKG-4chip] [Module (Waterproof)]</td>
<td>[Water Purifier] [Bidet] [Surface Disinfection] [Humidifier] [Ice Maker]</td>
</tr>
<tr>
<td>275nm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# SVC Products for UV-A Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Wave length (nm)</th>
<th>Z5</th>
<th>nZ5</th>
<th>AAP</th>
<th>CA Dome</th>
<th>CA Flat</th>
<th>NUV COB</th>
<th>Lamp</th>
<th>Module</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Printing]</td>
<td>385 - 405</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>[Adhesive]</td>
<td>365</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>[Exposure]</td>
<td>385 - 405</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>[Nail Curing]</td>
<td>405</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Air Purification/Deodorizing</strong></td>
<td>365</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Air Purifier]</td>
<td>365</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>[Air Purifying System]</td>
<td>365</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>[Automotive HVAC]</td>
<td>365</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>[Refrigerator]</td>
<td>365</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td>[Air Conditioner]</td>
<td>365</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
<tr>
<td><strong>Insect Attraction</strong></td>
<td>365</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SVC Products for UV-A Applications</th>
<th>365-405</th>
<th>365-405</th>
<th>365-405</th>
<th>365-405</th>
<th>365-405</th>
<th>365-405</th>
<th>365</th>
<th>365</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Insect Trap]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>●</td>
</tr>
</tbody>
</table>

---

**Insect Attraction**

- 365 nm

---

**Air Purifier**

- 365 nm

---

**Air Purifying System**

- 365 nm

---

**Automotive HVAC**

- 365 nm

---

**Refrigerator**

- 365 nm

---

**Air Conditioner**

- 365 nm

---

**Insect Trap**

- 365 nm
# SVC Products for UV-B and UV-C Applications

<table>
<thead>
<tr>
<th>Application</th>
<th>Product Coverage (nm)</th>
<th>AAP</th>
<th>CA Flat</th>
<th>TO39</th>
<th>DUV COB</th>
<th>Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterilizing</td>
<td>[Bidet]</td>
<td>275</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Cutting Board]</td>
<td>275</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Air Purifier]</td>
<td>275</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Water Purifier]</td>
<td>275</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Humidifier]</td>
<td>275</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Ice Maker]</td>
<td>275</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td>[Skin Care]</td>
<td>310, 340</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
<tr>
<td>Horticulture</td>
<td>[Plant Growth]</td>
<td>285</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td></td>
</tr>
</tbody>
</table>
# UV Finished Products

<table>
<thead>
<tr>
<th>Insect Trap</th>
<th>Indoor</th>
<th>Travel</th>
<th>Semi-outdoor</th>
<th>Outdoor</th>
<th>Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IH1</td>
<td>IH2</td>
<td>IP1</td>
<td>IS1</td>
<td>IW1</td>
</tr>
<tr>
<td>Insect Trap &amp; Deodorization</td>
<td>Standard</td>
<td>Compact</td>
<td>Portable</td>
<td>Standard</td>
<td>Water Resistance</td>
</tr>
</tbody>
</table>

## Air Purifier

<table>
<thead>
<tr>
<th>Automotive</th>
<th>Indoor</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1</td>
<td></td>
</tr>
<tr>
<td>AC2</td>
<td></td>
</tr>
<tr>
<td>AS1</td>
<td></td>
</tr>
</tbody>
</table>

Deodorization, Air Disinfection | Deodorization, Air Disinfection | Deodorization, Air Disinfection |

## Sterilizer

<table>
<thead>
<tr>
<th>Multi-purpose sterilizer</th>
<th>Large container, wireless charging and voice alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS1</td>
<td>SM1</td>
</tr>
</tbody>
</table>

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www.seoulviosys.com
Total Solution For UV LED
Total Solutions for Industrial Applications

Nail

Adhesive

Counterfeit

Printing

Forensic

Exposure
Total Solutions for Home appliances

- Air Conditioner
- Water Purifier
- Air Purifier
- Refrigerator
- Clothing Refresher
- Washing Machine

- 99.99% Air Sterilization
- 99.99% Water, Surface Sterilization
- VOC Removing, Deodorization
- 2.5x High performance
## Applied products

### Air purification and Sterilization module by violeds technology applied to world wide home appliance products

<table>
<thead>
<tr>
<th>Refrigerator</th>
<th>Air Conditioner</th>
<th>Air Purifier</th>
<th>Water Purifier</th>
<th>Water dispenser</th>
</tr>
</thead>
</table>
# Applied products

## Air purification and Sterilization module by violeds technology applied to world wide home appliance products

<table>
<thead>
<tr>
<th>Ice Maker</th>
<th>Humidifier</th>
<th>Sterilization</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
</tr>
<tr>
<td><img src="image4.png" alt="Image" /></td>
<td><img src="image5.png" alt="Image" /></td>
<td><img src="image6.png" alt="Image" /></td>
</tr>
<tr>
<td><img src="image7.png" alt="Image" /></td>
<td><img src="image8.png" alt="Image" /></td>
<td><img src="image9.png" alt="Image" /></td>
</tr>
</tbody>
</table>

[Company Confidential]

< 27 >
Total Solutions for Bio applications

- Skin Treatment
- Analysis
- Tanning
- Plant Growth
- Vitamin D Synthesis
- Medical device
UV-B Boosts Vitamin D in Mushrooms

UV-B increases Vit D in mushrooms (several to thousand times)

<table>
<thead>
<tr>
<th>UV-B dose (J/cm²)</th>
<th>0.0</th>
<th>2.5</th>
<th>5.0</th>
<th>7.5</th>
<th>10.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vit D₂ (μg g⁻¹)</td>
<td>21.5</td>
<td>120.1</td>
<td>144.4</td>
<td>168.3</td>
<td>187.7</td>
</tr>
</tbody>
</table>

UV on gills is more effective than on caps in Vit D boosting

In the US:
UV-treated mushrooms are Generally Recognized as Safe (GRAS) by FDA

Walmart, US

In Europe:
UV-treated mushrooms are allowed in the market by European Commission (EC)

Banken Champignons b.v., The Netherlands

In Europe:
UV on both
UV on caps
UV on gills
Cannabis

- Its growth and medical and recreational use are legalized in more and more countries including US, Canada and many in Europe

THC (Δ^9-tetrahydrocannabinol)
- Best known biologically active compound in Cannabis
- Highly concentrated in glandular trichome

UV-B treatment on Cannabis
- Increases concentration of Δ^9-THC in leaves and flowers of Cannabis
- Increases the number of glandular trichomes increased

THC in Cannabis increases by UV-B treatment in the dose-dependent manner

The number of glandular trichomes, saps of essential oil on leaves and the reservoir of THC in Cannabis (green arrows in the picture), increases by UV-B treatment
MARKETING THRUST

- WE ARE #1
- HIGHEST MANUFACTURING CAPACITY
- TRusted ENGINEERING
- CUSTOMER PROTECTION
INCREASE BRAND AWARENESS

CONFERENCES—SPEAKING ENGAGEMENTS AS EXPERTS

• Strategies in Light
  – *UV LEDs from Niche to Mainstream*

• BIG Ideas – RadTech
  – Focuses on UV technologies
  – *UV LEDs for Food Safety and Quality*

• LED Horticulture Conference
INCREASE BRAND AWARENESS

EXHIBITION

• Strategies in Light—co-booth with SSC LT?

• LightFair—co-booth with SSC LT?

• BIG Ideas –RadTech—SVC standalone booth

• RadTech Winter Annual Meeting—SVC standalone booth

• LED Horticulture Conference—co-booth with SSC LT?
INCREASE BRAND AWARENESS

ADVERTISING & MEMBERSHIPS

• International Ultra Violet Association (IUVA)
  – Need membership
  – Quarterly white papers/opinions

• Water Conditioning & Purification Magazine (WC&P)
  – Article on progress of UV LEDs and Water Reactor design

• LEDs Magazine
• LEDinside
• Grower’s Network
INCREASE BRAND AWARENESS

DISTY PARTNERS

• Future Electronics / Future Lighting Solutions
  – WEBINARS / TRAINING SESSIONS
  – FUTURE MARKETING PROGRAMS

• DigiKey
  – WEBINARS / TRAINING SESSIONS
  – DK MARKETING PROGRAMS