



**Advanced Vibration Isolation**

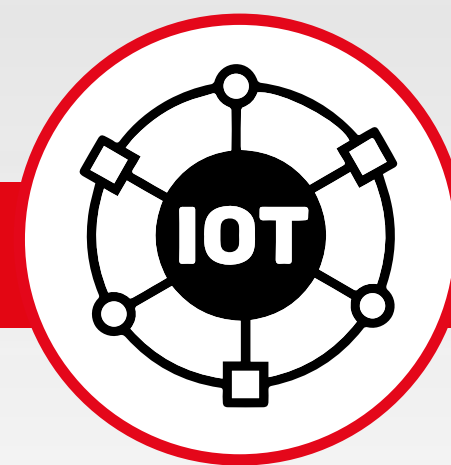
# **Electronic Microscopes**

Application Note





**Vibration  
isolation**



**IoT**



**Artificial  
intelligence**



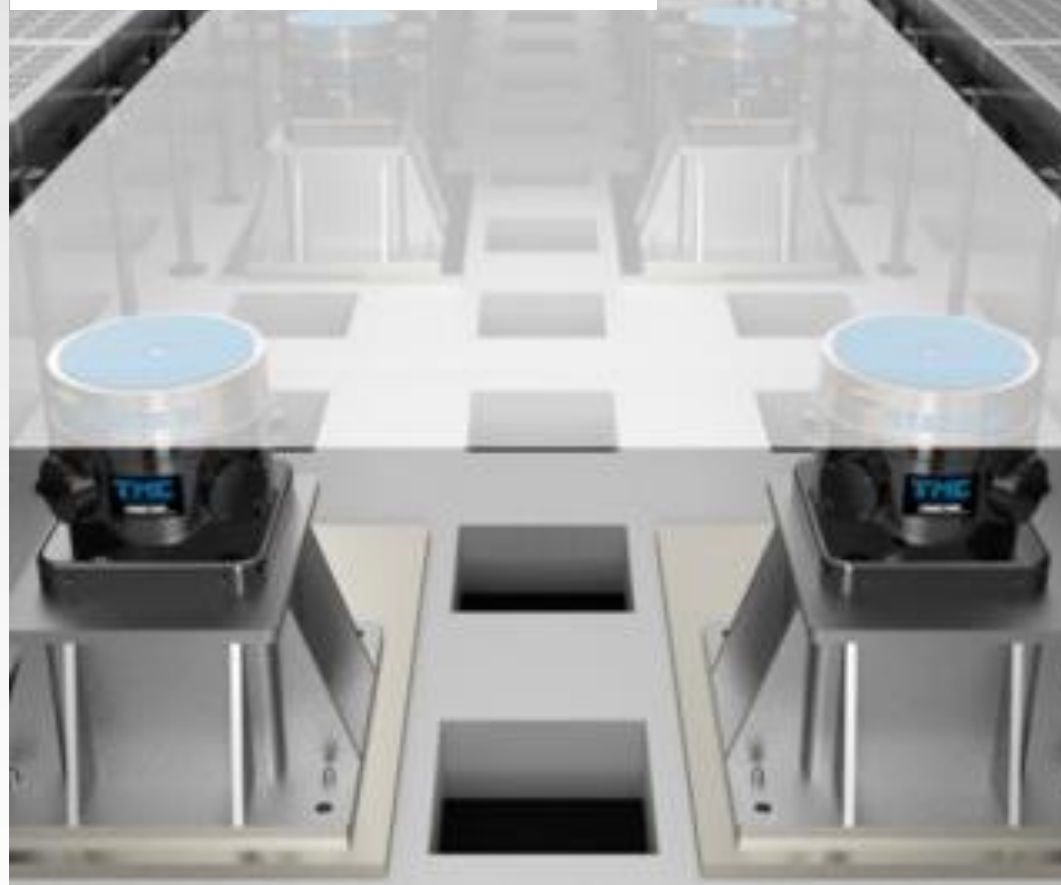
**Sensing  
vibrations  
sources**





## Existing Methods

Building Specially-Raised  
Isolated Floors



Changing Ground Foundation  
With Special Concrete Blocks

Passive Damping  
With Concrete Blocks



**Fundamental**  
No possibility to change  
tool location



**Machine long  
down time**

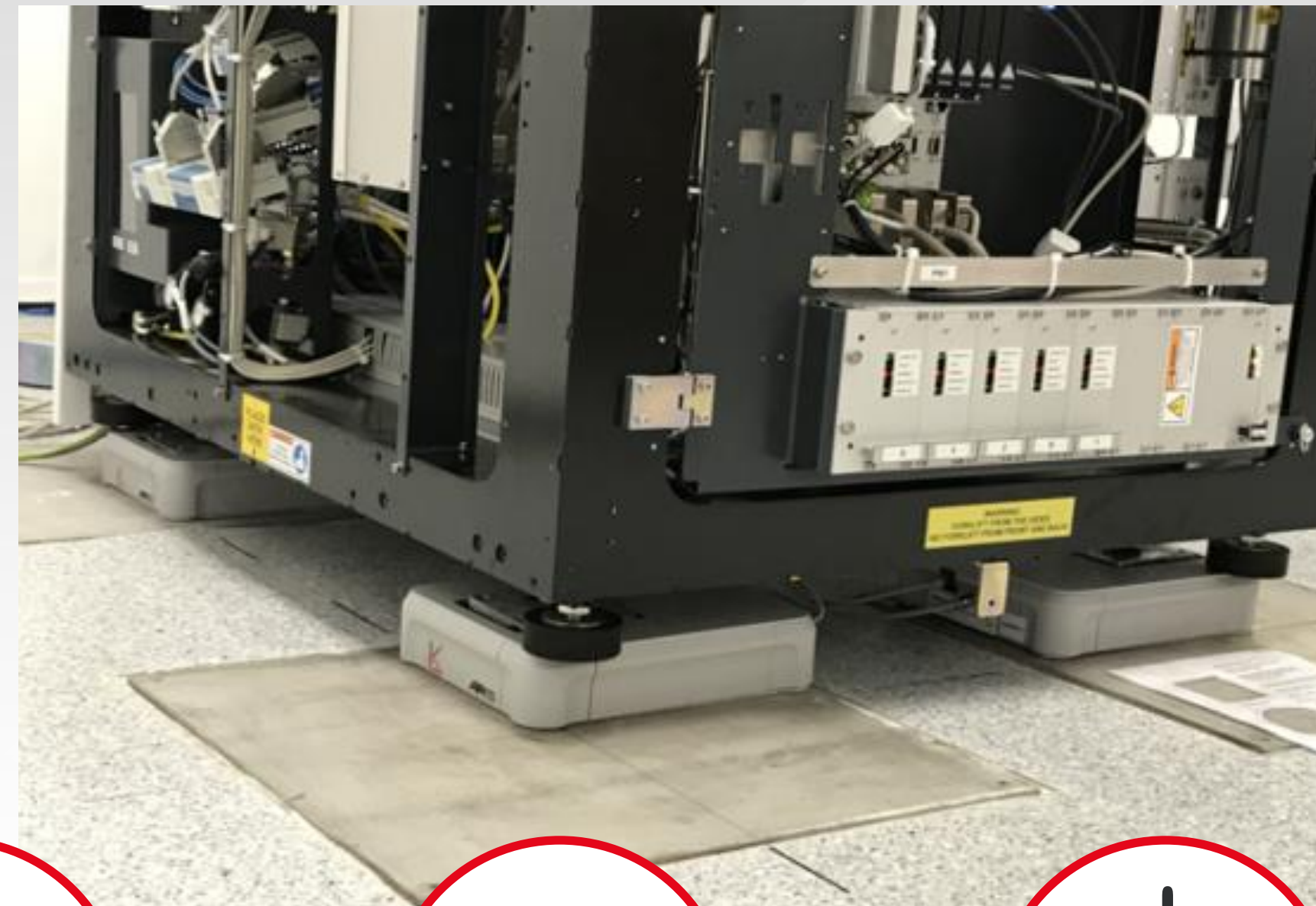


**No flexibility  
no configurability**



**Expensive**





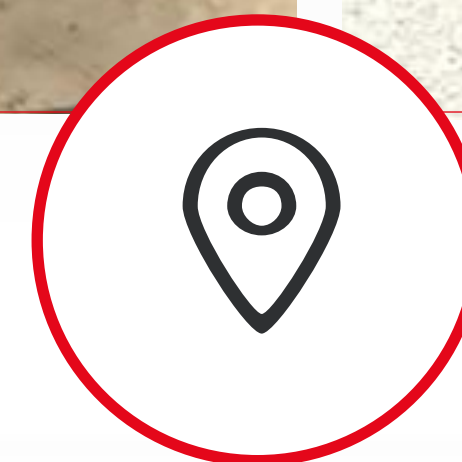
**Elegant  
Design**



**Lower  
Installation Cost**



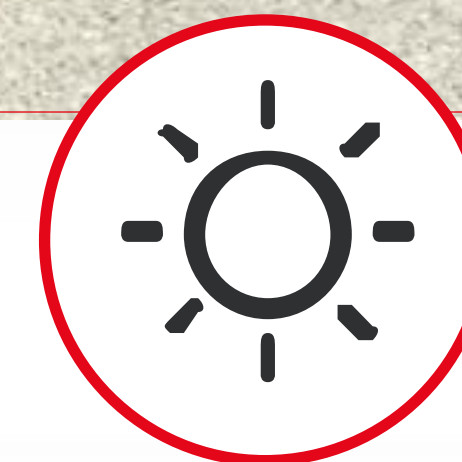
**Straightforward  
Installation**



**Flexible  
location**



**High  
performance**



**Adjustment to  
environment  
conditions**





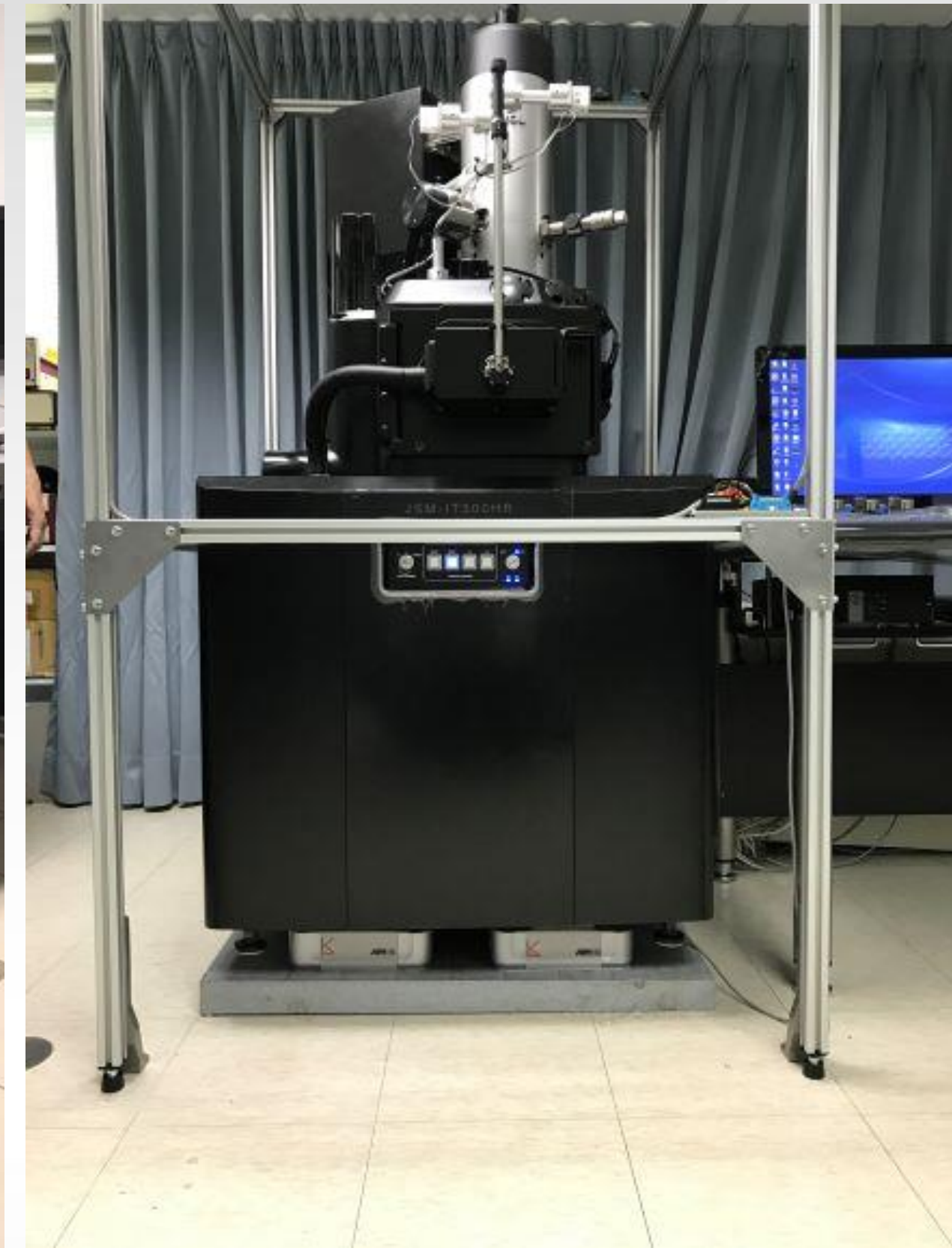
## Installation Examples – No need to lift the tool



**Hitachi SEM**



**Tescan SEM**



**JEOL SEM  
Installed on a 10<sup>th</sup> Floor**



## Installation Examples – No need to lift the tool



**FEI Titan TEM**



**FEI Meridian SEM – ArisMD  
installed under  
the SEM**



**FEI Helios FIB  
Installed on 2nd Floor**



**FEI Apreo SEM  
Installed on 1st Floor**



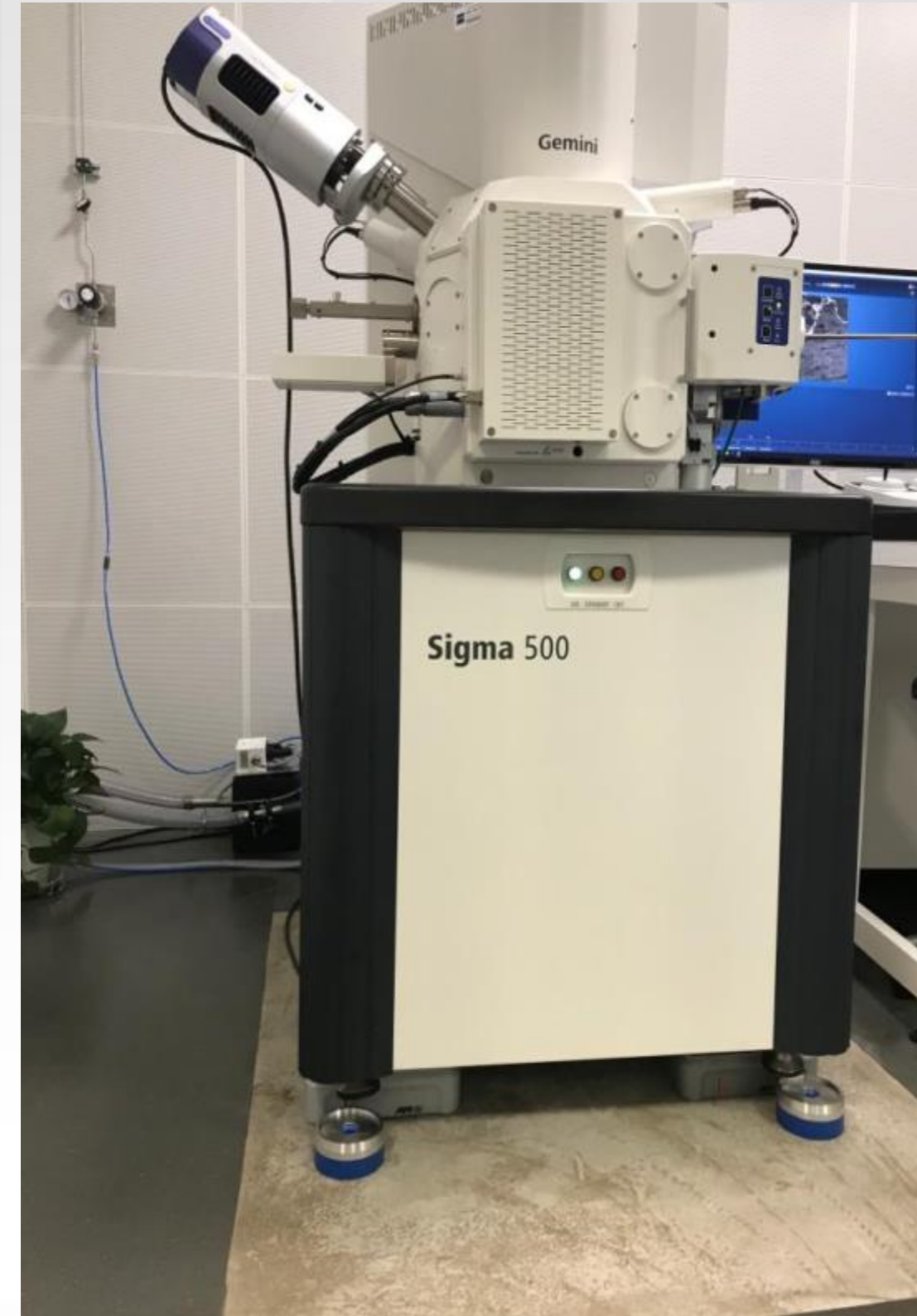
## Installation Examples – No need to lift the tool



**JEOL SEM**  
**Installed on a 10<sup>th</sup> Floor**



**JEOL TEM**  
**Installed on a 4<sup>th</sup> Floor**



**Zeiss Gemini**  
**Sigma500**



**Zeiss SEM**  
**Installed on a bay area**  
**On a wood floor**





## Key Features

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- **Performance**
  - 6 degrees of freedom
  - Active gain starting from 0.5Hz
  - Decoupled architecture (patent pending)
  - Variable Damping (patent pending)
  - Build In Artificial Intelligence Feature
- **Small Size, elegant design, low weight.**
- **No piezo electric elements in use**
  - Practically unlimited life time for sensors and motors, using by K&S systems
  - Significantly lower life time cost
- **Easy installation for heavy tools – no need for lifting tools and heavy construction.**
- **Capabilities**
  - Higher Actuators stroke
  - Adjustable by software active bandwidth
  - Remote control
- **Built in real time diagnostic tools**
  - Spectrum analyzer
  - Oscilloscope
- **Highly Tunable Vibration Isolation Control – the systems can be configured to challengeable environmental conditions**
- **Customizable due to flexible internal architecture**





## Comparison K&S **ARISMD** versus competitors Piezo Electrical elements based Active Vibration Isolation Systems

Feature	Air Base Vibration Isolation Systems	Piezo Electric Vibration Isolation System	K&S <b>ARISMD</b>	Comments
<b>Load Capacity</b>	Practically Unlimited load with properly sized Isolators	Up to 2000Kg per Isolator not more than 4 isolators per system in total max 8000kg	Up to 1000 Kg per Module Practically Unlimited load due to unlimited number of modules per system	Number of modules calculated for required load and size
<b>Architecture</b>	Centralized Control: Central Controller, Maximum 4 Isolators per system connected in Star configuration	Centralized Control: Central Controller, Maximum 4 Isolators per system connected in Star configuration	Distributed Control: Independent Modules, Unlimited number of Modules per System	Flexible configuration: <ul style="list-style-type: none"><li>• Saves cost</li><li>• <b><u>Increase System reliability.</u></b></li></ul>
<b>Performance</b>	~2 times vibration reduction from 2 Hz at Floor vibration <u>less than 45 µm RMS</u> (combined for all frequencies) Good Isolation above 20 Hz	~10 times vibration reduction from 2 Hz and above, at Floor vibration <u>less than 9 µm RMS</u> (combined for all frequencies)	~10 times vibration reduction from 2 Hz and above, at Floor vibration <u>less than 45 µm RMS</u> (combined for all frequencies)	<b>ARISMD</b> <ul style="list-style-type: none"><li>• No air (avoid all associated problems with air)</li><li>• Frame mountable</li><li>• Properly damped</li><li>• Significantly smaller in size</li></ul>
<b>Motor's Stroke, used to compensate Floor displacement</b>	Air floor controlled actuators or Linear motor's Stroke practically unlimited <u>200 µm (p-p)</u>	Piezo actuators Stroke LIMITED to <u>&lt;12 µm (p-p) below 10 Hz</u>	Linear motor's Stroke practically unlimited <u>200 µm (p-p)</u>	<u>Air based</u> systems have all problems related with high air flow. Required heavy linear motors to control position. <u>Piezo systems</u> will have ZERO isolation at the high Floor displacement input (happened randomly/periodically on real FAB floors)





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Feature	Air Base Vibration Isolation Systems	Piezo Electric Vibration Isolation System	K&S <b>ARISMD</b>	Comments
<b>Size and Mount</b>	Isolators size is proportional to the required load. Height typically > 300 mm Mount <u>only</u> ON THE TOP of the Platform	Each Isolator is 300 x 320 x 275 mm Mount <u>only</u> UNDER the top of the Platform	Each Module is 270 x 230 x 75 mm Can be positioned <u>and</u> ON THE TOP <u>and</u> UNDER the Platform	Height is very important <ul style="list-style-type: none"><li>• Effect height of Tool's CoG (more sensitive to Tilt and Roll)</li><li>• Tool or room ceiling height can be a limit</li><li>• Adds ergonomic difficulties to operation and maintenance</li></ul>
<b>Use as a second level of Isolation</b>	<u>Cannot</u> be used in serious with internal Isolation system	Required additional Heavy duty Platform to support Tool Required lifting Tool ~0.5 m above the Floor to place 4 Isolators and Platform	No Platform needed Modules designed to fit between Floor and Tool's frame, space exist because of Tool's own leveling feet. NO LIFTING!	<b>ARISMD</b> <ul style="list-style-type: none"><li>• saves cost</li><li>• significantly reduces installation complications</li><li>• does not add height</li></ul>





**Advanced Vibration Isolation**

**Thank you**