

# every technical problem can be solved.

**Demcon high-tech systems is a full-service design house for the development, realization and testing of customized complex solutions.**

We believe that every technical challenge has a solution, and we are committed to enabling our customers to be successful. We serve OEMs, start-ups and scale-ups in a diverse range of industries and continue to build our track record within the fields of Semicon, Quantum and Photonics.

We work in close partnership with our customers to gain a deep understanding of their business challenges. Our process begins with a thorough analysis to define the criteria for success. Next, our multidisciplinary teams develop a model-based architecture, which is subsequently engineered into a functional prototype. The final step involves rigorous testing to ensure the solution meets all functional specifications and customer requirements.

Combining a structured and results-oriented project approach with a pragmatic way of working enables us to strike the optimal balance between performance optimization, product costs and time-to-market - all without posing any IP claims.

## CONTACT INFORMATION

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Tokyo - Japan

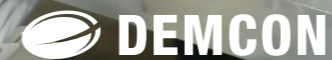


HIGH-TECH  
SYSTEMS

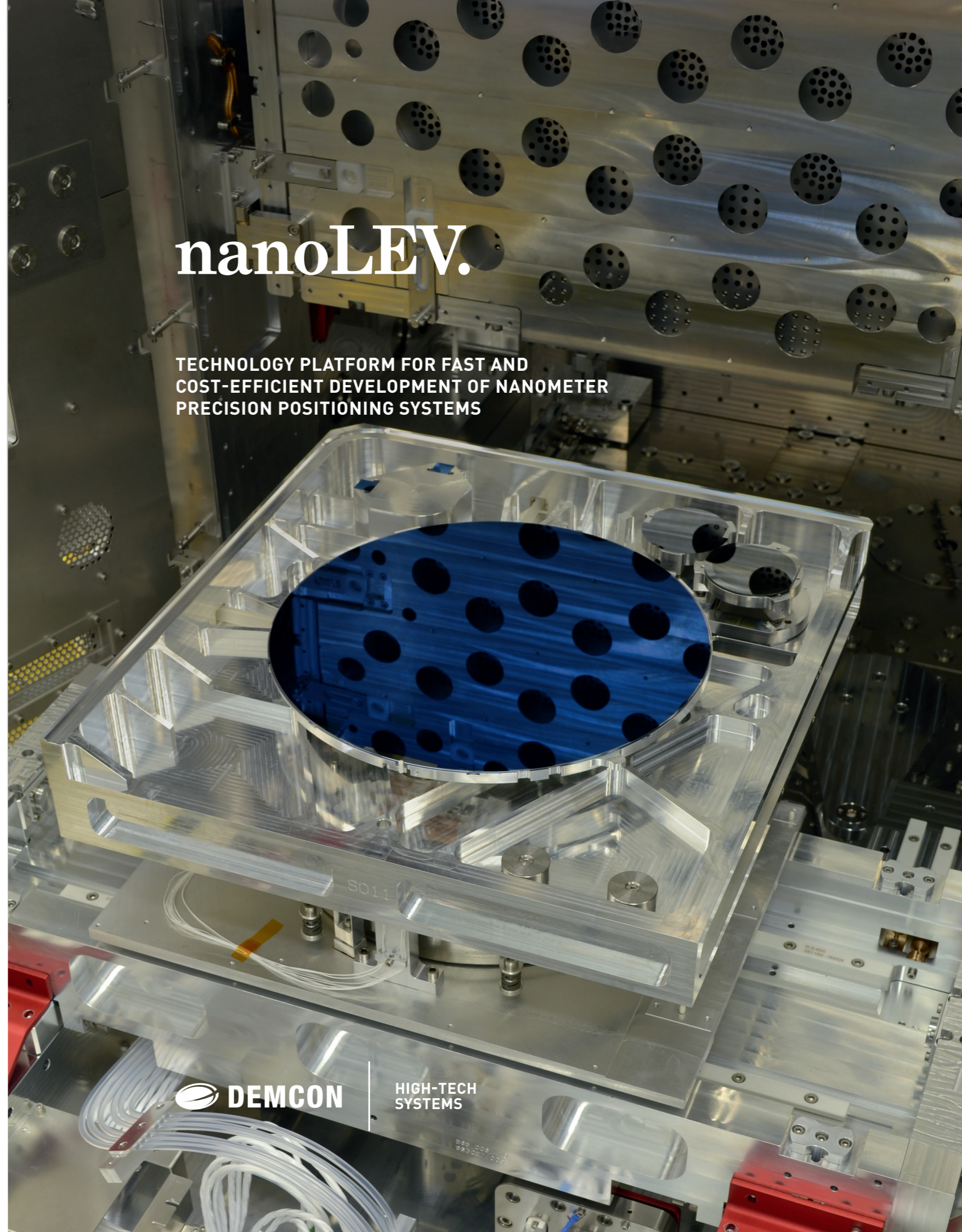


# nanoLEV.

**TECHNOLOGY PLATFORM FOR FAST AND  
COST-EFFICIENT DEVELOPMENT OF NANOMETER  
PRECISION POSITIONING SYSTEMS**

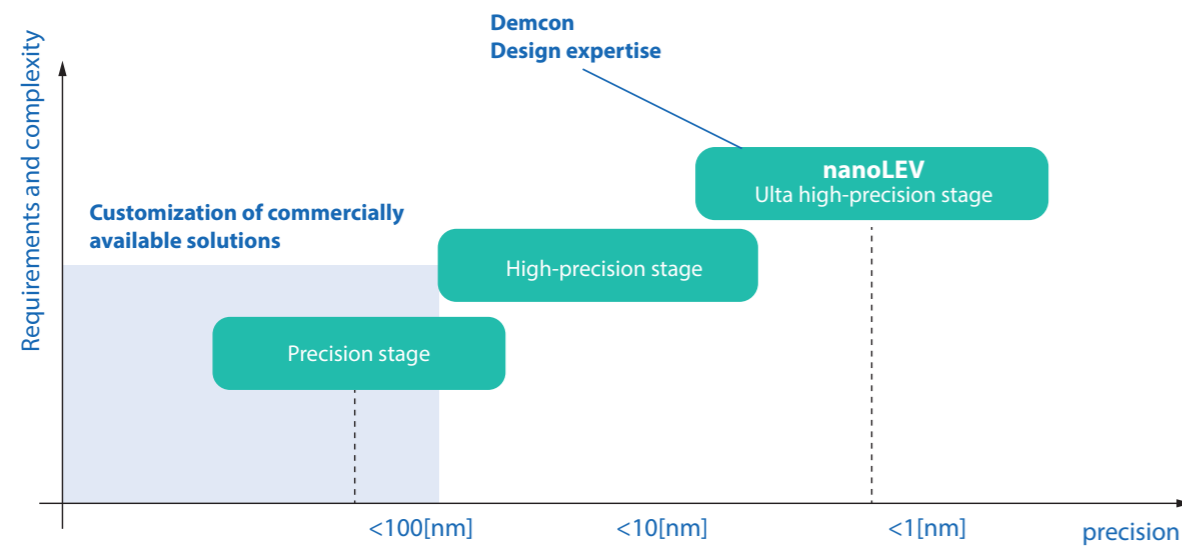


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SYSTEMS



## ULTRA HIGH-PRECISION STAGE

The nanoLEV platform consists of a library of technologies, components and sub-modules that can be combined into a customized ultra-high precision substrate positioning system. The availability of these libraries strongly reduces the development time and costs for customized ultra-high precision stages.



## WE DESIGN FOR YOUR NEEDS

Based on the nanoLEV platform we can customize the design to your specific needs:

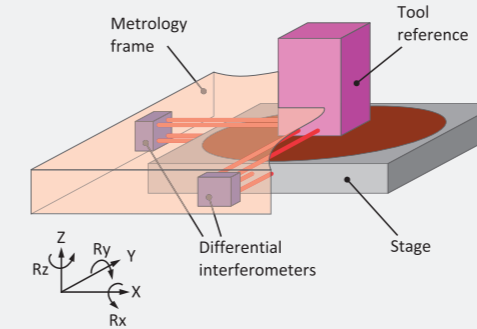
- Nanotesla magnetic field compliant
- Low outgassing for vacuum environment
- Low particle for substrate cleanliness
- Your pay-load, acceleration and velocity requirements
- Comply to mechanical interfaces and volume claim
- Comply to customer specified software and electrical interfaces

## MAXIMUM DEGREE OF FREEDOM

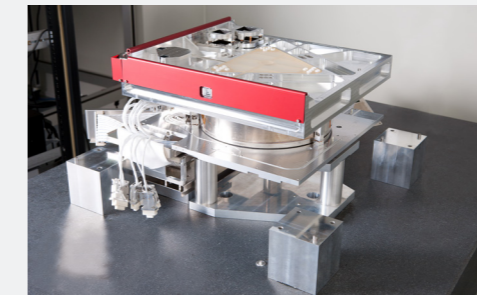
We offer flexible co-development arrangements to suit your needs. We have comprehensive stage design and production capabilities. However, we can also collaborate with your existing suppliers to provide the required design solutions, ensuring optimal use of your supply chain.

Platform specifications	Proven (Extendability)
Range X, Y, Z	350 x 350 x 1 [mm] (500 x 500 x 5 [mm])
Foot print	0.8 x 0.8 x 0.6[m] (-)
Maximum pay-load	2.0[kg] (5.0[kg])
Acceleration	1 [m/s <sup>2</sup> ] / (10 [m/s <sup>2</sup> ])
Velocity	0.3 [m/s] / (>1 [m/s])
Precision	1.1 [nm] @ 20 [mm/s] (<1 [nm] @ 500 [mm/s])
Accuracy	25 [nm] (<10 [nm])
Settling time	150 [ms] (<50 [ms])
Thermal load to substrate	0.1 [W] (0.01 [W])
Magnetic field change with stage movement	1 [nT] (<1 [nT])
Vacuum compatibility	1e-6 [mbar] (1e-7 [mbar])
Particles per pass	Design for ≤ 1/40 @ >100 [nm]
Reliability	
MTBF	Design for < 1 [year]
Lifetime	Design for > 7 [year]

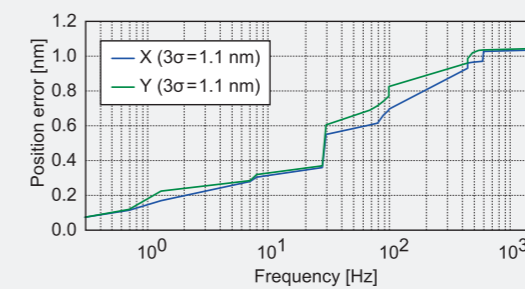
### Stage metrology



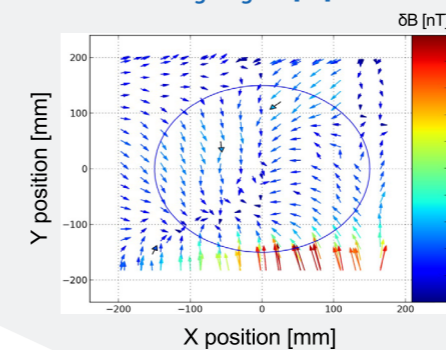
### nanoLEV short stroke



### Stage XY positioning error [nm]



### B-field for moving stage in [nT]



## OUR DESIGN CAPABILITY

NanoLEV can meet the most stringent requirements for dynamic positioning by applying proven control concepts for long stroke and short stroke positioning. We combine structural FEA of our stage design with control algorithms and simulation to fully evaluate our mechanical and control design to your system requirements before hardware is build.

The control algorithms can be implemented by our software engineers, on the platform you prefer. Or from our existing real-time OS experience, including FPGA real time analog and digital data acquisition solutions. nanoLEV includes solutions for thermal management at nanometer accuracy. E.g. low thermal load on your substrate by gravity offset and optimization of actuator design. Further we design with low thermal expansion materials and apply inline algorithmic corrections to achieve the ultimate positioning specifications for your application.

The ultra-high precision stage is a 6 DOF short-stroke magnetic levitation stage, which is built on top of a traditional 3 DOF XY-stage with ball- or air bearing technology.

## YOUR ENGINEERING PARTNER

With over 25 years experience in designing performance-critical positioning systems, we bring a first-time-right approach when developing your high-accuracy positioning system. Beyond our expertise in system-level design for positioning systems, we offer additional services to meet your specific needs:

- Translating imaging system requirements to stage performance requirements
- FEA for vibration propagation evaluation and vibration isolation design
- Metrology solutions for nanometer accurate substrate alignment
- Stage calibration to achieve nanometer precision
- Positioning system assembly, integration and verification