



National University
"Zaporizhzhia Politechnic" as
a New Step in the History of
the Technical Education in
the Black Sea Region
”*Black Sea Universities Network*”

**Dr. Sergiy Byelikov,
Rector**

Bucharest, 2019



НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ «ЗАПОРІЗЬКА ПОЛІТЕХНІКА»

NATIONAL UNIVERSITY «ZAPORIZHZHIA POLYTECHNIC»

**ТЕХНІЧНА ОСВІТА - ЦЕ ПРАКТИЧНЕ ЖИТТЯ, ЯКЕ СТАВЛЯЄ
ЗА МЕТУ ЗРОБИТИ БІЛЬШ ПРОДУКТИВНОЮ РОБОТУ ВСІХ
ТИХ, ХТО ПРАЦЮЄ. СТВОРЮЄТЬСЯ МАТЕРІАЛЬНЕ
БЛАГОПОЛУЧЧЯ НАЦІЇ.**

Д. П. ПОДДЕРЬОГІН



**Beginning - Technical school
1900**



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MEMORABLE DATES OF THE UNIVERSITY HISTORY

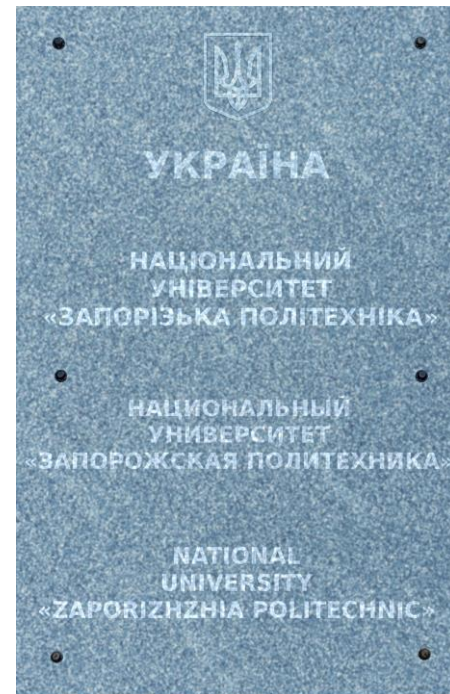
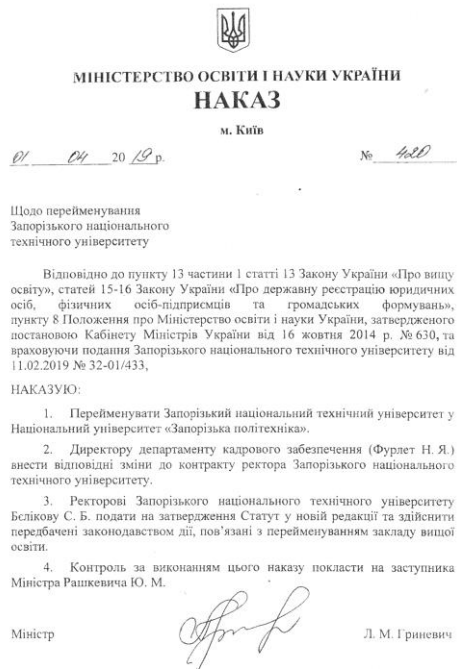
- November 5 (18), 1900** - first seven-year mechanical technical vocational college in Ukraine was established in the town of Alexandravsk (now Zaporizhzhia).
- 1920** - the mechanical technical vocational college was reorganized in an industrial college with qualifications of the higher education institution.
- 1930** - Zaporizhzhia Industrial College became Zaporizhzhia Agricultural Engineering Institute.
- 1941** - the Institute was evacuated to Barnaul, Altai Region.
- 1944** - the Institute reopened in Zaporizhzhia after the fascist occupation of the city ended.
- 1957** - Zaporizhzhia Agricultural Engineering Institute was renamed Zaporizhzhia Machine construction Institute (ZMI).
- 2001** - ZSTU was awarded a status of national institution; ZSTU is renamed Zaporizhzhia National Technical University.
- 2008** - Sergey Belikov, Yuriy Vnukov and Alexander Kachan became State Award Laureates in Science and Technics.
- 2010** - ZNTU receives a Laureate Diploma of social act “Leaders of Ukrainian science and education” and Grand Prix diploma “Leader of High Education of Ukraine” for significant contribution to scientific and educational development of state of Ukraine, development of Education and Science image of Ukraine.
-



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Our latest achievement - «ZAPORIZHZHIA POLITECHNIC»

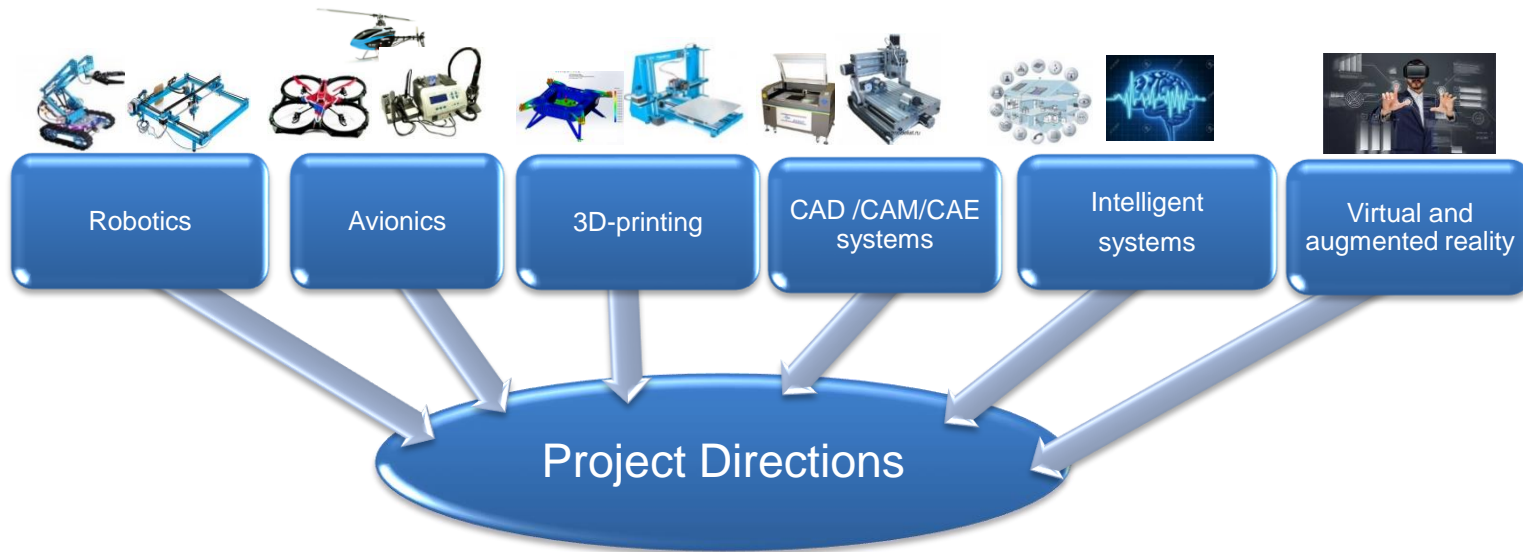




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Open laboratory of cyber-physical systems





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Laboratory in Virtual Reality





Laboratory in Virtual Reality

Unmanned technologies in education



- NXP Cup
- RoboRace

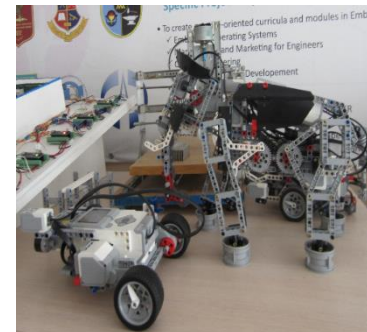
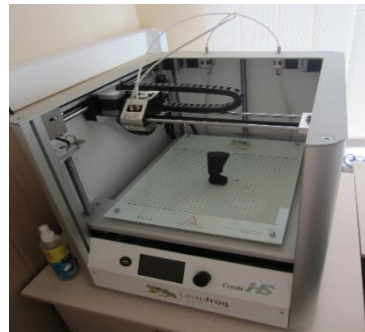
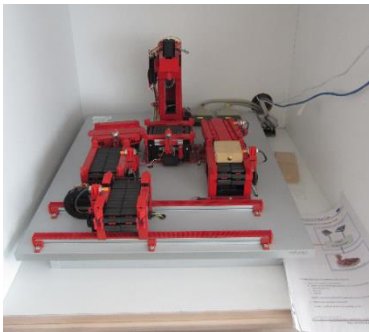
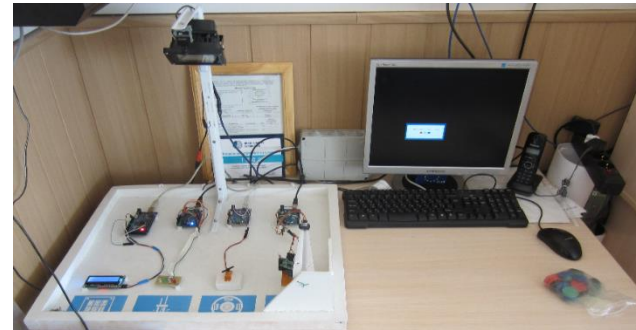




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Remote laboratory of embedded systems





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Board of European Students of Technology



**EBEC -
European
BEST
Engineering
Competition**





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NATIONAL UNIVERSITY «ZAPORIZHZHIA POLITECHNIC»

Zaporizhzhia region industry



PREOBRAZOVATEL



ZAPORIZHSTAL



ISKRA



ZAZ



MOTOR SICH



**ZAPOROZH
TRANSFORMATOR**



IVCHENKO-PROGRESS



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Cooperation with JSC “MOTOR SICH”

Motor Sich is one of the leading enterprises in the world manufacturing engines for airplanes and helicopters as well as industrial gas turbine installations



MOTOR SICH





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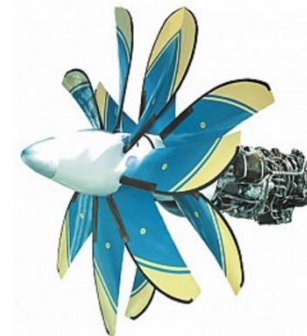
Products of JSC "MOTOR SICH"



MS-500V-S family engines



D-18T series 3



D-27



MSB-8 Helicopter



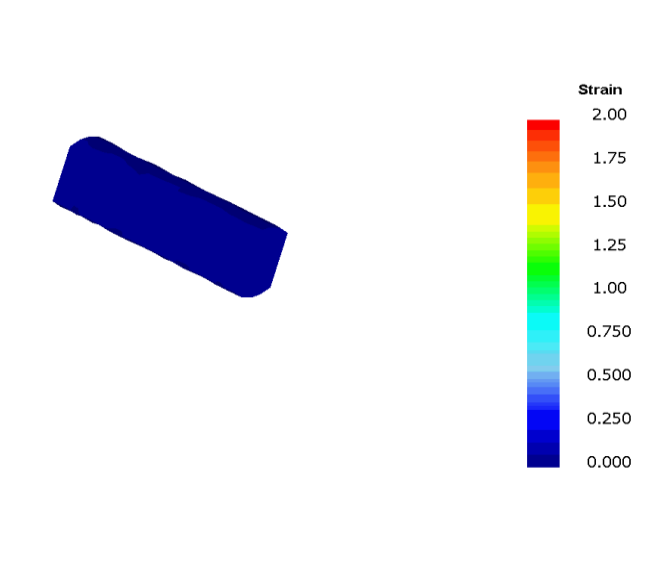
AI-450-MS



Mobile power station

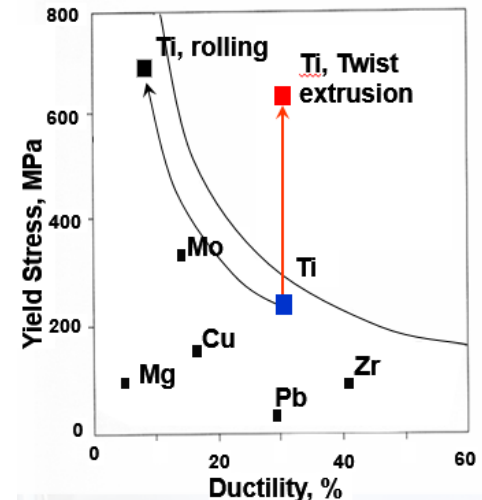


The technology processes for producing aircraft engines based on severe plastic deformation method Twist Extrusion



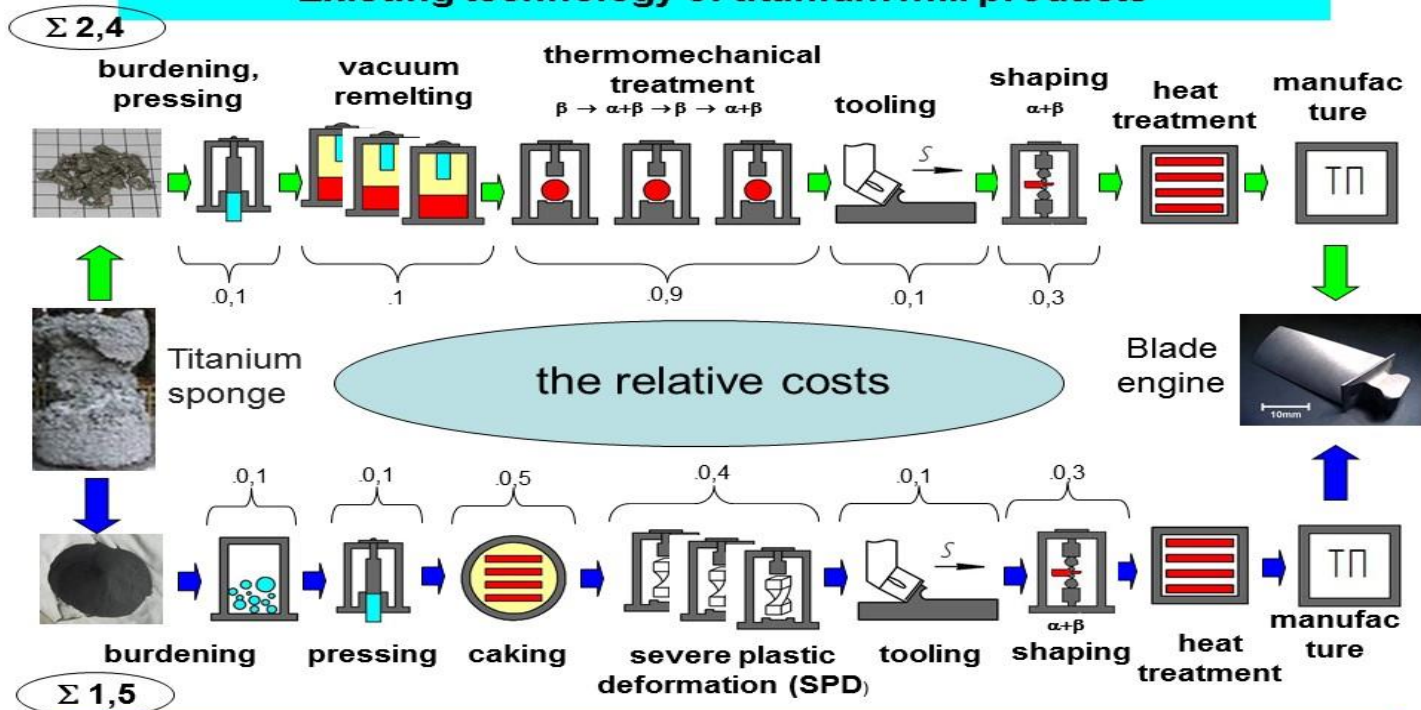
We have a technology for obtaining blank for the aircraft engine parts with submicrocrystalline structure

We have unique equipment and technologies for severe plastic deformation of the blanks made of titanium, titanium powders and aluminides





Existing technology of titanium mill products



New «green» technologies for manufacturing aircraft engine parts from powders

New technology of titanium mill products



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CRDFGLOBAL
INSPIRED BY PEOPLE | DRIVEN BY SCIENCE



**General
Electric**

Our partners:



MOTOR SICH



**DonIPE
National Academy
of Sciences of
Ukraine**

We cooperate with :

- Lund University, Lund, Sweden
- Laboratory of Excellence "DAMAS" University of Lorraine-Metz, France
- Institute of Nanotechnology (INT), Karlsruhe Institute of Technology (KIT), Germany
- Institute of Fundamental Technological Research, Polish Academy of Sciences, Poland



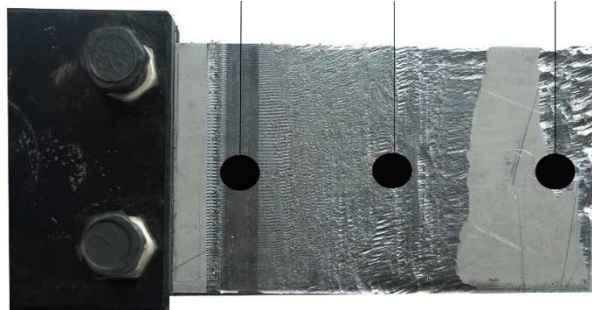
Blade



Rings



The application of IoT technologies for vibration diagnostics of complex aviation systems and the process of cutting thin-walled parts



Surface of the plate after high-speed finishing with various modes



Blings

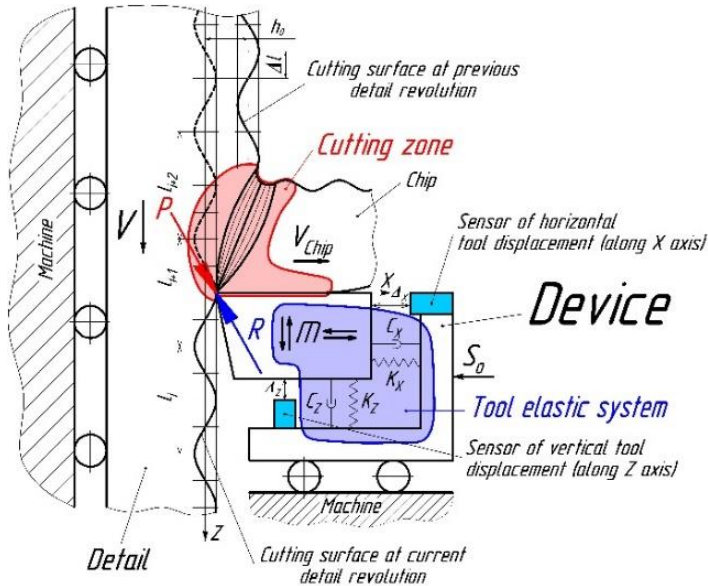


High-speed milling of mono-wheels

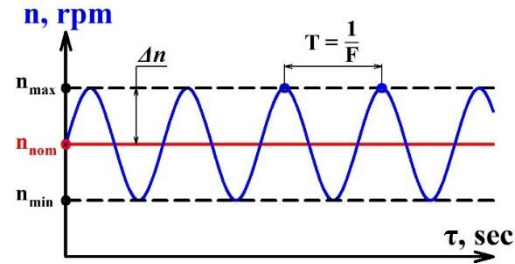


Development of program code for improving the technology of turning GTE parts on CNC machines using cutting speed and feed variation

Scheme of cutting process in main section plane
Pr:



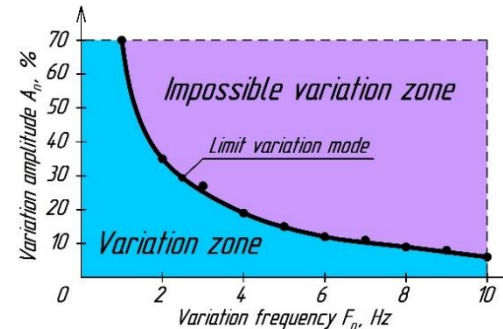
Scheme of spindle speed variation



n – actual spindle speed, rev/min;
 n_{nom} – nominal spindle speed, rev/min;
 τ – time, sec;
 T – variation period;
 F – variation frequency;
 RVA – ratio $\Delta n / n_{nom}$;
 RVF – ratio $60 \cdot F / n_{nom}$

$$n = n_{nom} \cdot (1 + RVA \cdot \sin(2\pi \cdot RVF \cdot n_{nom} / 60 \cdot \tau)), \text{ rev/min}$$

Scheme of main drive capabilities

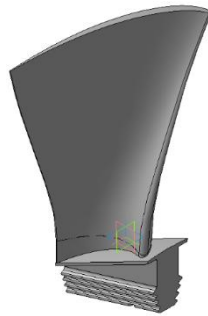


Possible variation zone – the range of values of amplitude and frequency, which main drive **is able** to execute in accordance with control program

Impossible variation zone – the range of values of amplitude and frequency, which main drive **is not able** to execute in accordance with control program



Heat-resistant nickel alloys castings after hot isostatic pressing



blade



hot isostatic pressing



**Shrinkage and microporosity
in the material**

In the process of hot isostatic pressing (HIP) of blades it occurs the "healing" of micropores and friables which are not coming out to the surface of parts. It results in stabilization of the structure and properties of the material. The structural un-homogeneity is typical for the material of blades and samples after HIP. It appears as the result of formation of the «raft»-structure in the form of zonal parts in the places of "healing" of pores and around of MC-type carbides.



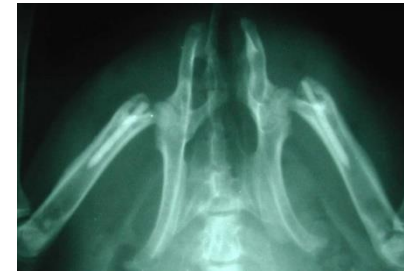
Biodegradable casting alloys based on magnesium for osteosynthesis



Maleolar screw D-3,5 mm,
made from a new biodegradable
magnesium alloy



hip bones



X-ray of the rabbit after
osteosynthesis by
implants from a bio-
soluble magnesium alloy.

Preclinical and clinical trials have investigated that this alloy is non-toxic and provides reliable bone grafting. Medical experiments have shown that the developed magnesium alloy has good biocompatibility, the required level of biocorrosion, mechanical properties and modulus of Young's elasticity, as close as possible to the cortical layer of the bone, as well as have an antibacterial effect



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Rest and sport

