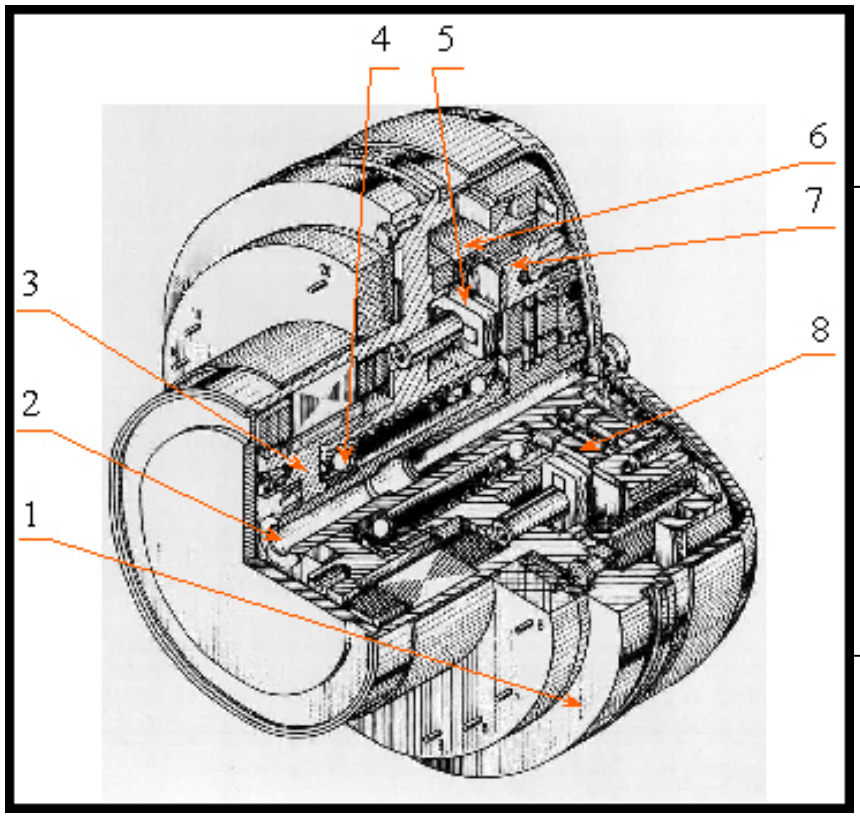
Russian State Technological University named after K.E. Tsiolkovsky

NONCONVENTIONAL LASER TECHNOLOGIES IN INSTRUMENT MAKING, MACHINE INDUSTRY AND AGRICULTURE

Chair of Technologies for Production of Aircraft Instruments and Control Systems

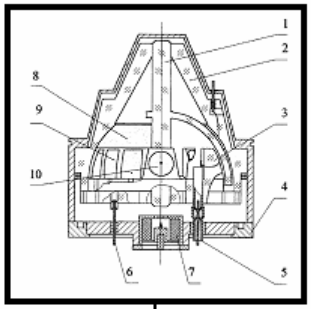
Suminov V.M. – Head of the Chair, Doctor of Technical Sciences, professor

DESIGN OF DYNAMICALLY TUNED GYROSCOPE (DTG)



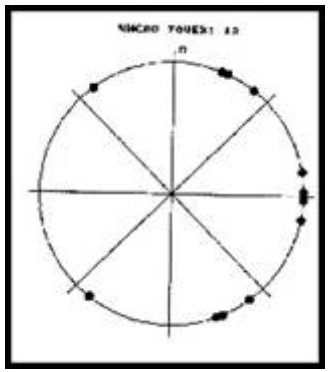
MAIN SPECIFICATIONS		ГВК-10	ГВК-16	BDK803	G2000
Input speed, ^{0} /sec	continuous	20	300	300	200
	short-term	100	700	600	400
Nominal frequency of rotation of the rotor, Hz		120	160	-	266
Constant of time, sec		30	6	-	3
Rate of torque motor (sec/A)		128	1000	333	390
Readiness time, min.		2	10	-	30
Locking time, sec		60	1	2	1.4
Random drift (1 sigma), ^{0}/h		0.2	0.5	0.2	0.1
Overall dimensions, mm		0.54x63	0.26x30	33x33.5	19x25
Mass, g		460	75	108	25

Development of methods of laser balancing and adjustment of wave solid-state gyroscope (WSSG)



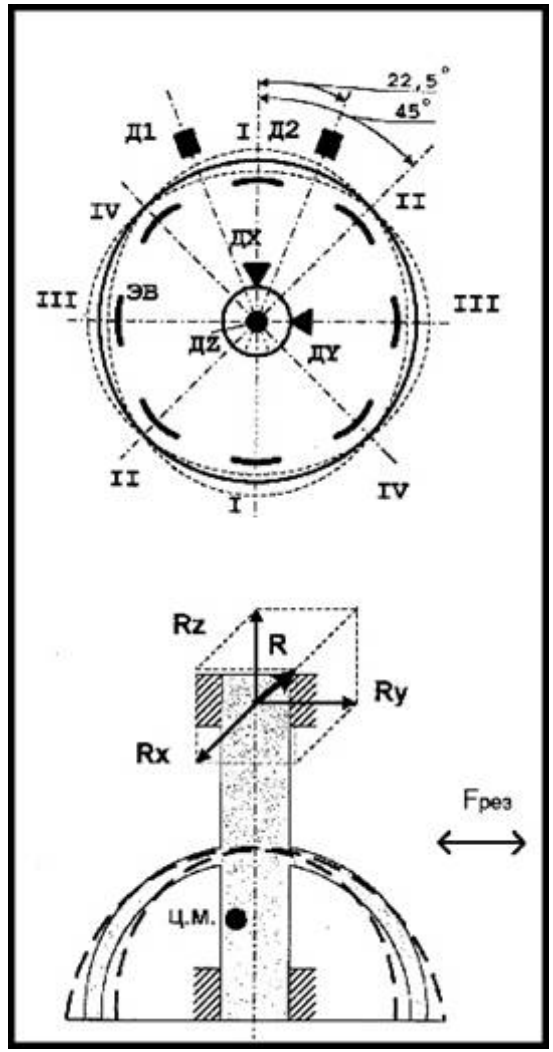
Gyroscope

Resonator

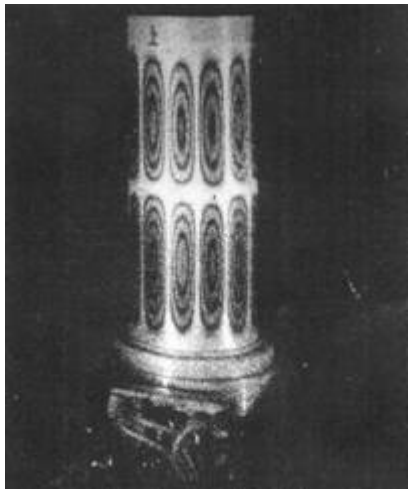


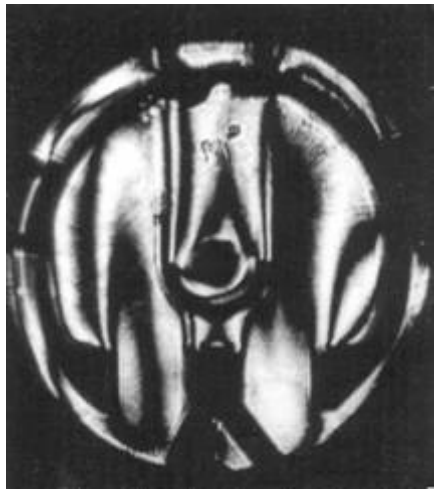
Complex technique of decomposition 1-4 harmonics of defect of mass distribution

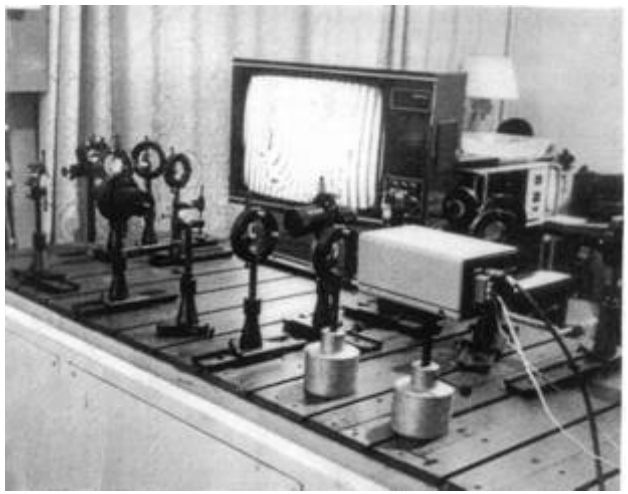
Complex technique of determination of 1-4 harmonics of the defect of mass distribution



Diagnostics of the sensitive elements of instruments based on holographic interferometry

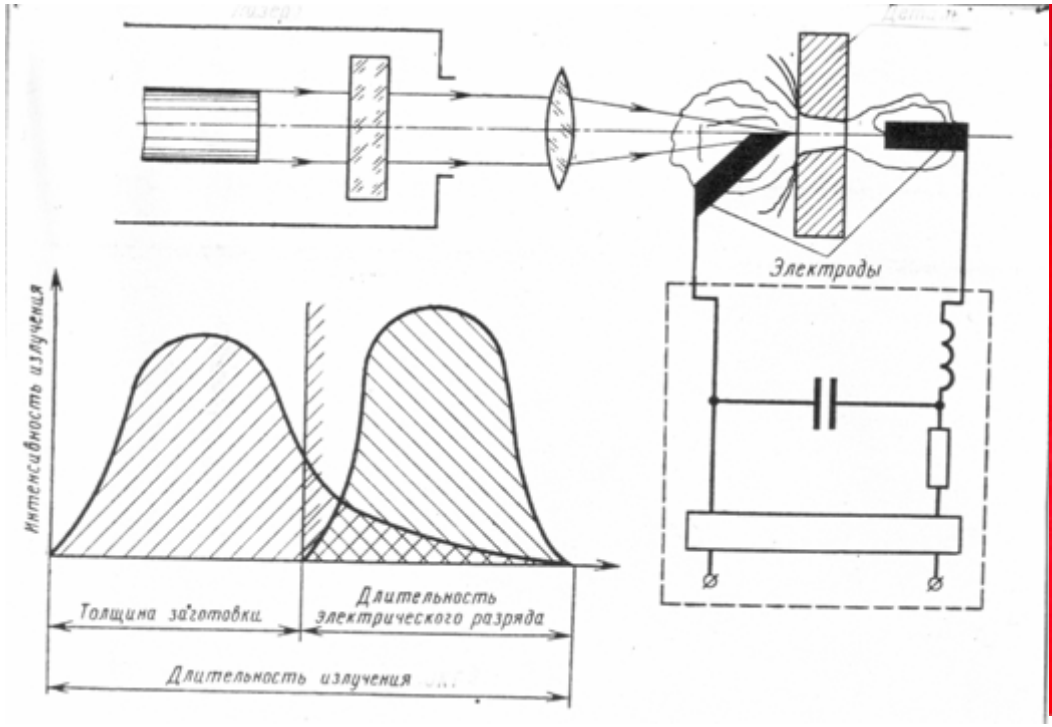




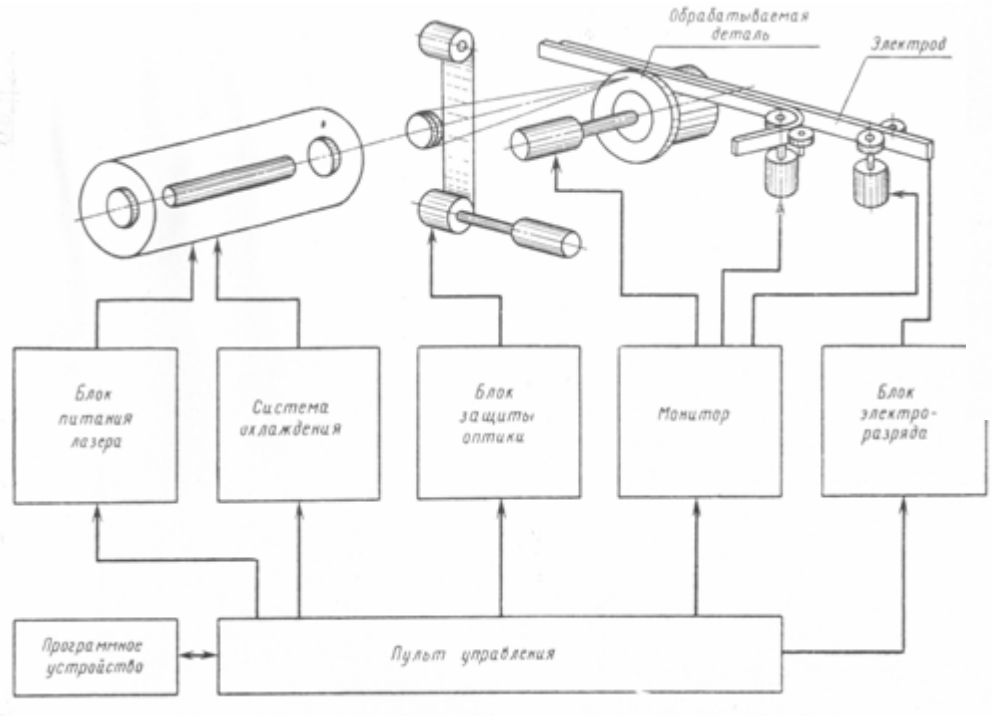


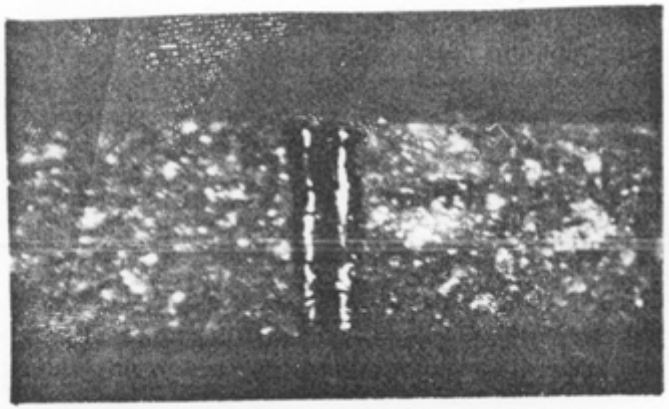
It is intended for quality control in production of sensitive elements for instruments and it allows to control geometrical parameters of parts, quality of welded, adhesive and soldered joints, and internal stresses.

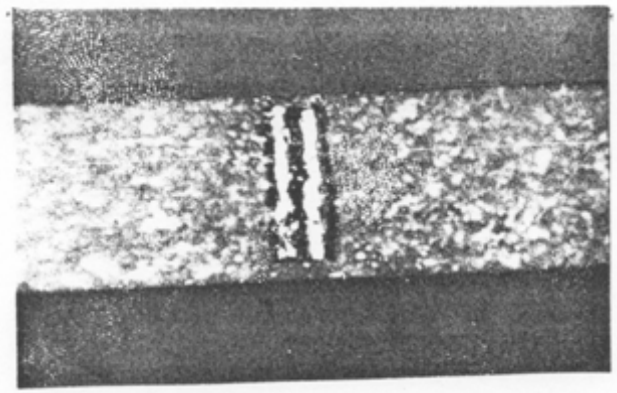
Making holes of small diameter with simultaneous current-conducting and wear-resistant coatings in them



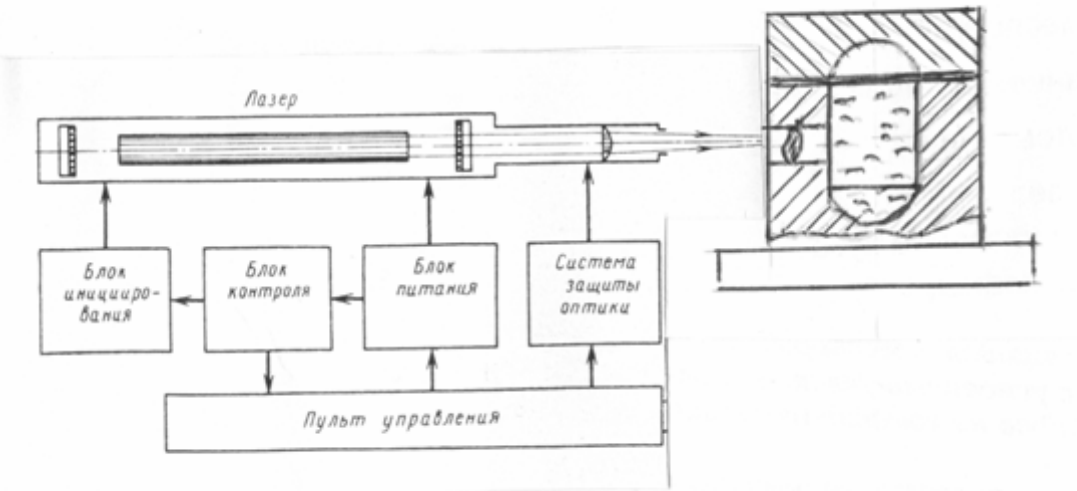
The technology allows to make holes with diameter of 0.05-0.2 mm in metal and non-metal materials with simultaneous plotting of coatings.

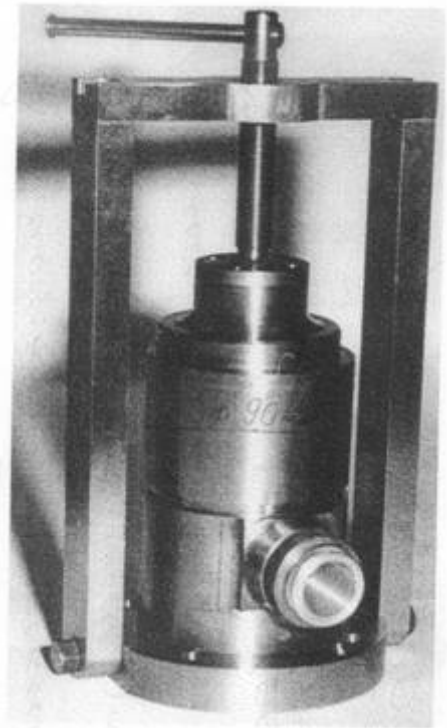

Обрабатываемая деталь
Электрод
Блок питания лазера
Система охлаждения
Блок защиты оптики
Монитор
Блок электро-разряда
Программное устройство
Пульт управления

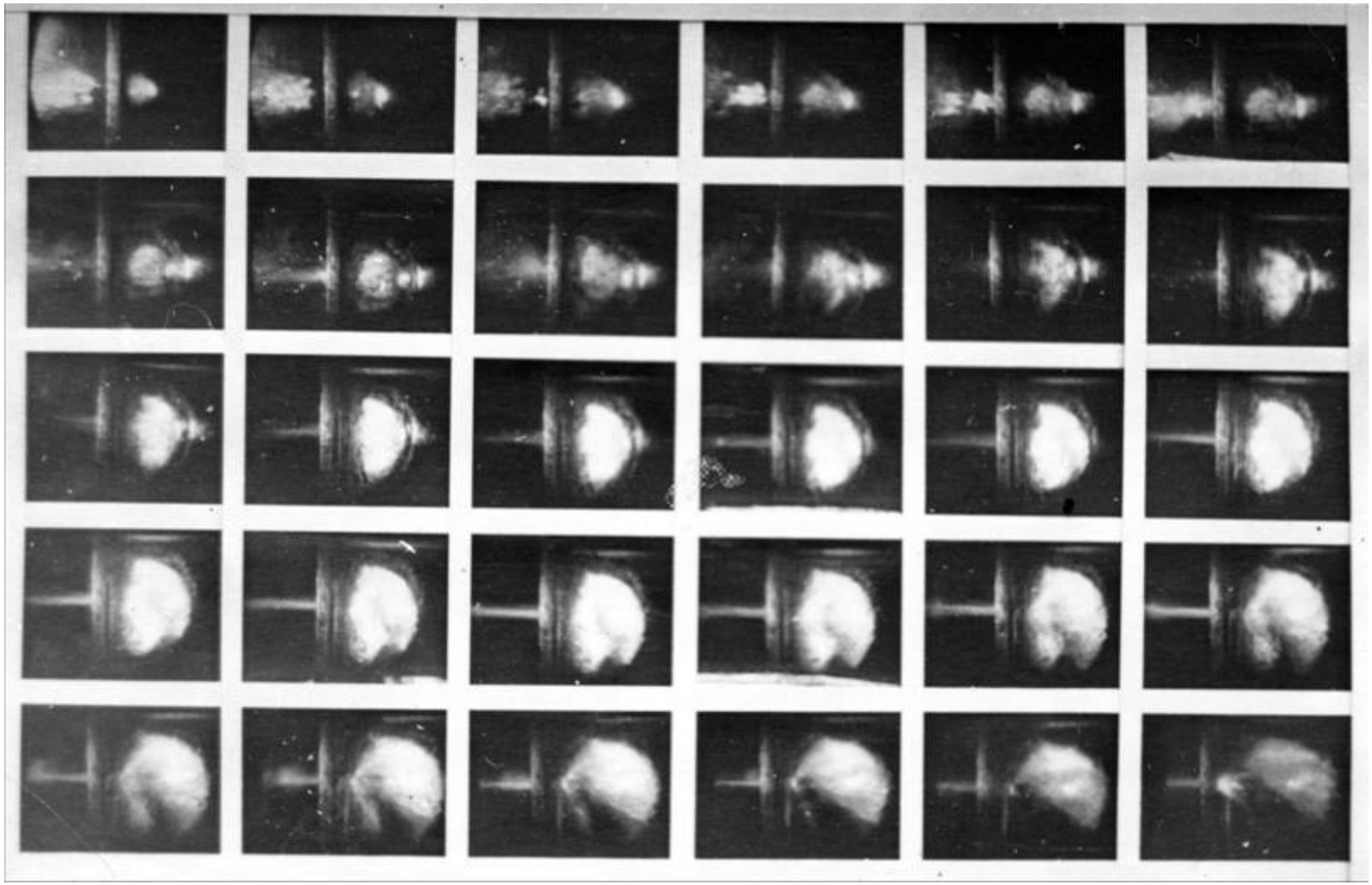


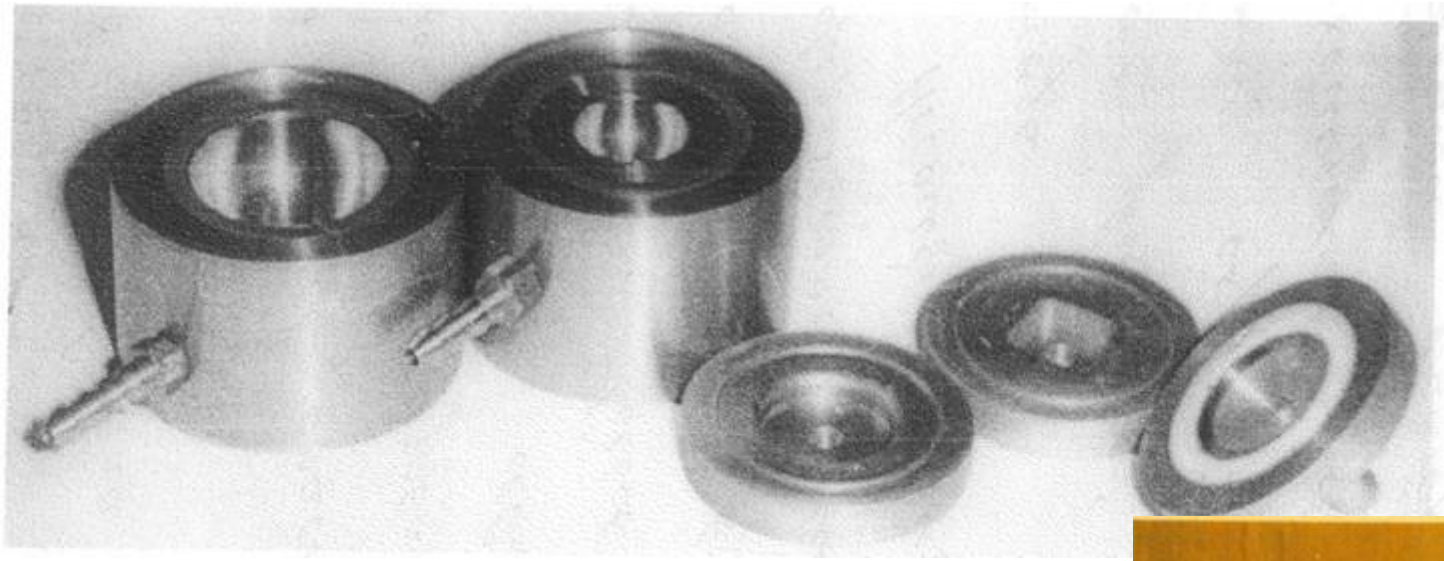


Light-hydraulic, high energy processing of details due to interaction of a laser radiation with a live environment









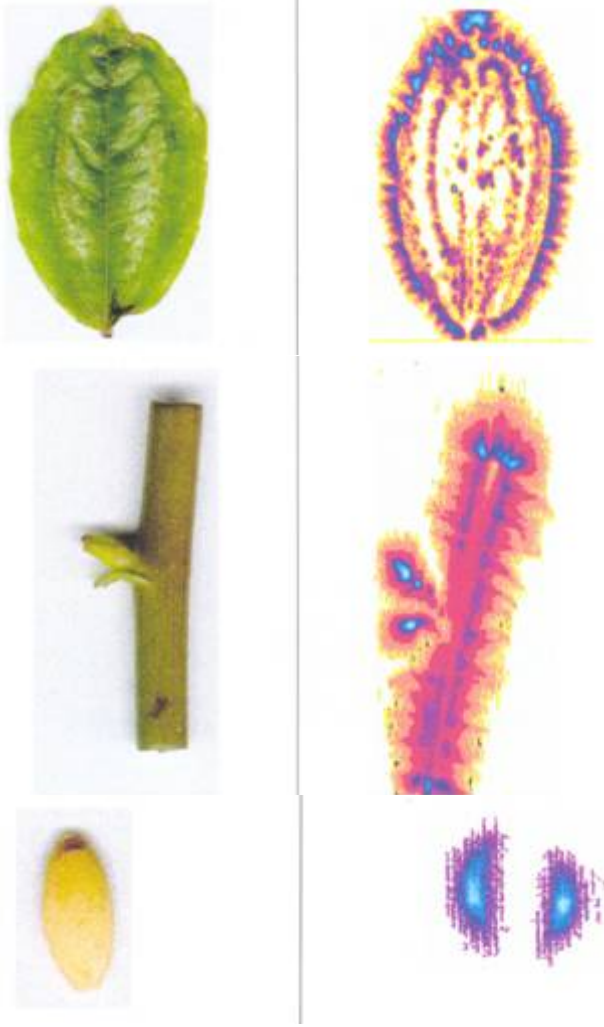
The technology allows to do drop forging, cutting, bending and drawing for production of thin-wall parts of instruments.

Stimulation of the growth of plants under the effect of a laser radiation

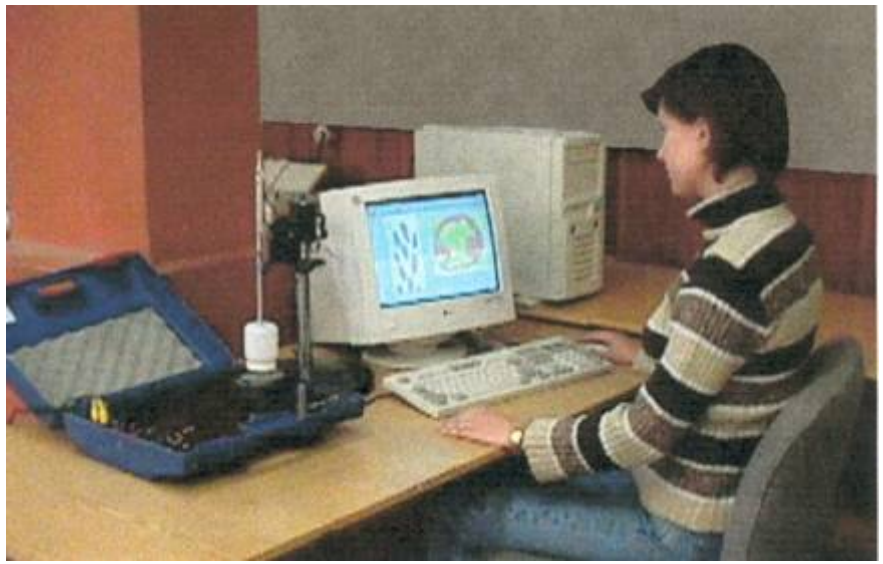
The technology and production equipment allow:

- To treat vegetables and garden-decorative plants in enclosed and open grounds;
- To augment productivity of vegetable crops by 25-30 %;
- To improve the consumer qualities of garden -decorative crops;
- To approximate the period of mass blossoming by 15-20 days;
- To increase the germinating capacity of seeds, disease-resistance of plants and their resistance to the environmental stresses.

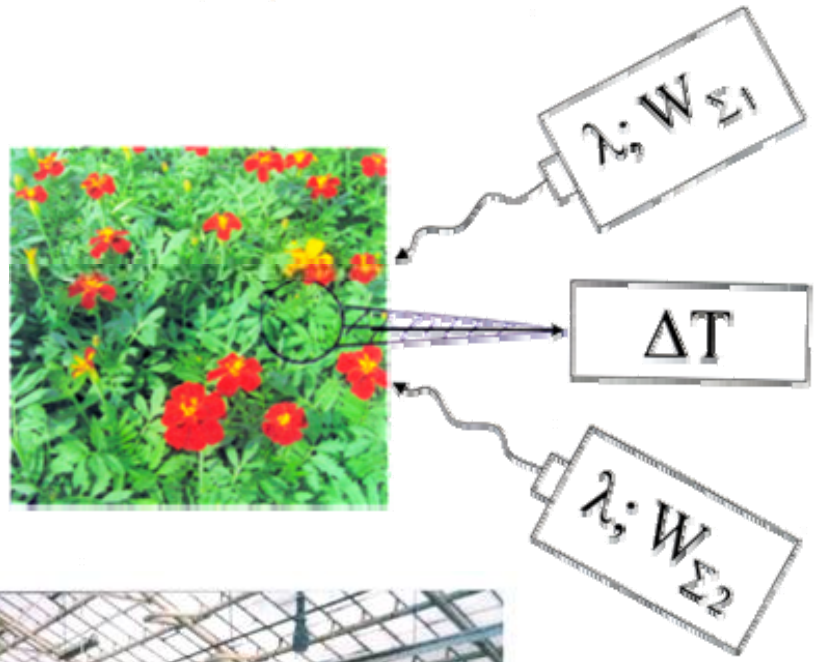
Diagnostics of morbidity of plants



Gas-discharge diagnostics



Light-stimulated diagnostics



The technology is intended for evaluation of the state of plants during their growth and of the planting stock in a preplant period.
In most cases the proposed laser technologies and equipment have no domestic or foreign analogues, and they were tested in industrial conditions and introduced in industry.