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UNITED NATIONS INDUSTRIAL ORGANIZATION

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PROJECT PROPOSAL

PART A - BASIC DATA

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COUNTRY : Korea/German Democratic Republic

PROJECT NUMBER : "Optical Measurement of Surface Texture"

PROJECT TITLE : Twinning Agreement between the Korea  
Institute of Science and Technology  
(KIST), Seoul, Korea and Jena  
Friedrich-Schiller University (JFU),  
Jena, GDR

SCHEDULED START : April, 1990

SCHEDULED COMPLETION : March, 1994

ORIGIN AND DATE OF  
OFFICIAL REQUEST : KIST, Korea/JFU, GDR

GOVERNMENT COUNTERPART  
AGENCIES :

UNIDO CONTRIBUTION :

GOVERNMENT CONTRIBUTION : Korea (US \$ 13,000/GDR US \$ 7,000)

CURRENCY REQUIRED FOR

UNIDO INPUT : US \$ 30,000

CONVERTIBLE :

OTHER :

UNIDO SUBSTANTIVE BACK-  
STOPPING SECTION :

PROGRAMME COMPONENT CODE :

PROPOSAL SUBMITTED BY : KIST and JFU

DATE OF SUBMISSION :

## PART B NARRATIVE

### 1. Background and Justification

High precision optical measurement techniques on surface quality are demanded in manufacturing as well as research works for future industrial development and for process improvement. It is well known that much of them needed integrated efforts of highly specialized personnel. The main objectives of this project are the organization of a relevant cooperation for the solution of problems in the optical surface measurement.

Jena Friedrich-Schiller University (GDR) has made tangible progresses in development and testing of an automatic scattered light goniometer for measurement of roughness of coated and uncoated surfaces;

Development and testing of an automatic device for measurement of scattered light of surface defects;

Investigations to band with limitation of measurement of scattered light action of surface defects and dust;

Present research activities (exact state of art of this research) involve high resolution in three-dimensional space for reflection and transmission with any scanning geometry, together with development of an automatic Laser-Scan-Defect-Sensor for recognition of defects of lenses for in-process testing.

K IST (Korea) has also been quite involved in optical scanning of surface texture characteristics and direct inspection of the machined product, to enlarge the application of optical measurement in the area of surface characterization, and very keen to exchange the precision optical measurement related techniques with the interested parties. This mutual interest has put Jena Friedrich-Schiller and K IST to agree to conduct a joint research program in optical measurements.

The Ad-Hoc Expert Group Meeting among KIST and Jena Friedrich-Schiller University under the assistance of UNIDO would provide recommendations the problems of optical measurement of surface textures.

## 2. Objectives

The main objectives of this project are to measure the roughness and defects of smooth technical products with precision using optical means and to enable ultraprecision manufacturing by means of automatic sensor systems based on optoelectronic principles. Close co-operating between the two research institutes of Korea and GDR sharing experiences and facilities would provide the precision manufacturing related services to industrial application in their own countries.

## 3. Project Outputs

Through implementation of this project, both institutes will increase their capabilities in order to become focal points of innovation and technology improvement in their countries. In particular outputs from this project are expected to produce:

- automatic sensor systems to be used in laboratories and production processes, where registered surface rms-roughness may be more than about 1 nm and defect width longer than about 1  $\mu$ m

- theoretical and experimental investigations for optical testing of roughness and defects of smooth surfaces with development of new techniques
- construction designs and software within the financial frame of the project

#### 4. Project Activities

Research activiting involves testing of Laser-Scan-Defect-Sensor for recognition of different defects and development of new sensor heads for scattered light detection , and development of a microfile interferometer.

In order th facilitate the attainment of the main objective of the project, both institutes, on the basis of the time schedule of the project inputs and allocated budget, will exchange researchers, train personnel, and organize a symposium and perform advisory services when a need arize.

#### 5. Project Input

UNIDO will provide US\$30,000 for the period April 1990 - March 1991 in convertible currency and equivalent of US\$ 20,000 in local, non-convertible currency will be provided by the countries concerned (Korea: US\$ 13,000 and GDR: US\$ 7,000 ).

#### 6. Evaluation Plan

The project will be evaluated during the implementation and upon completion by the NGOs, Business and Industrial Institutions Co-operation Section, and PDES with participation of the representatives from KAIST and FSU.

7. Envisaged Follow-up

The first phase of this three-year project will end in July 19 .  
Upon careful evaluation of experiences gained during this period,  
a follow-up project will be considered by the NGOs, Business and  
Industrial Institutions Co-operation Section, and PDES.

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PART C - CLEARANCE AND APPROVAL

Cleared by:

Date:

Date:

Approved by:

Date:

Amount approved

Source of Funds:

Convertible Currency:

Other

Date PAD requested:

Annex 1

WORKING PLAN 1990/1992

- |   | <u>Starting date</u>                |
|---|-------------------------------------|
| 1. <u>Project Commencement</u><br>Exchange copies of papers<br>and informations   | April, 1990                         |
| 2. <u>Exchange of Staff</u><br>Meeting will be held to discuss<br>the project in KAIST, Seoul, Korea  | May, 1990<br>(Continued every year) |
| 3. <u>Meeting of Experts</u><br>- in GDR/ 2 persons<br>- in Korea/ 1 persons<br><br>It will be continued every year<br>during the research period | November, 1990<br>May, 1991         |
| 4. <u>Exchange of information</u><br><br>Periodic exchange of experimental<br>plans, results, technical publi-<br>cations, and other informations | Continuously                        |
| 5. <u>Seminar</u><br><br>Seminar will be held during the<br>periodic expert meeting   | November, 1990<br>May, 1991         |

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Annex 2

FINANCIAL CONTRIBUTION OF  
UNIDO TO WORKING PLAN 1990/1992

Expert Component

Starting date

Round trip tickets for 1 GDR  
staff to participate on the start-  
up meeting in Seoul, Korea/Jena-  
Seoul-Jena

May, 1990

Round trip tickets for 2 experts  
in Jena meeting/Seoul-Jena-Seoul

November, 1990

Round trip tickets for 2 experts  
in Seoul meeting/Jena-Seoul-Jena

May, 1991

Miscellaneous

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TOTAL

US \$ 30,000



