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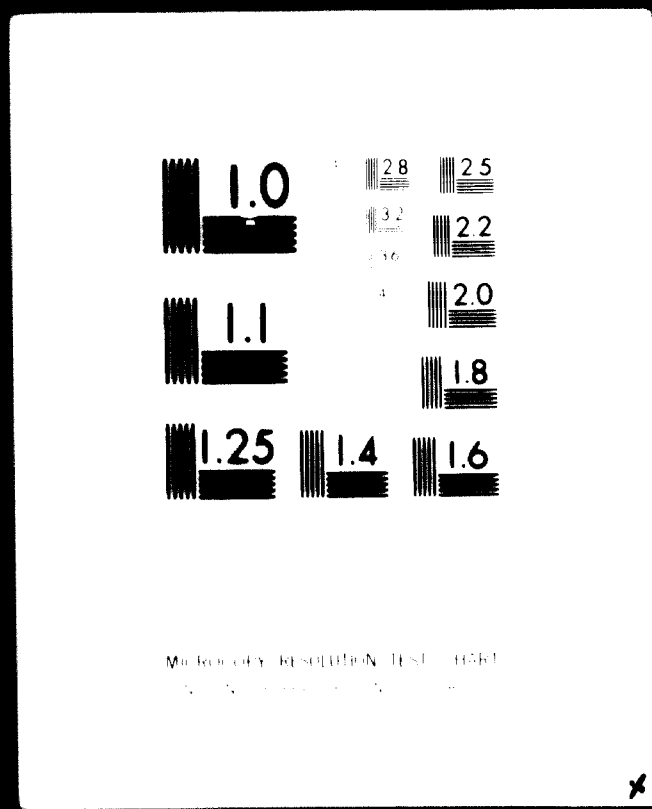
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FINAL REPORT

**ASSISTANCE IN PROCESS CONTROL
IN THE FOOD INDUSTRIES,**

ROMANIA

SI 70/1002 (ROM-27)

from



AGRAR- UND HYDROTECHNIK GMBH

Consulting Engineers

Essen 1972

Federal Republic of Germany

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INTRODUCTION

The Romanian food industries are headed by M.A.I.A.A., the Ministry of Agriculture, the Food Industries and Water.

In order to reach a high quality standard in food production, the Romanian Government has imported in the last ten years numerous complete plants for the food industries - or at least complete parts of production lines from foreign countries, such as the Federal Republic of Germany, France, Italy, the German Democratic Republic, Denmark, Belgium, and Switzerland.

As pointed out in the "Terms of Reference" of this UNIDO contract, in the field of instrumentation and process control in these industries, the Government of Romania is facing two problems:

1. In 1970, part of the food industries was heavily damaged by an immense flood catastrophe.
2. On a long-term basis, the use of automation should be widely extended in these factories.

Therefore, the Government proposes the establishment of an Instrument and Automation Centre for the food industries which meets the requirements to solve the above mentioned problems. It is understood that the Centre will provide not only consultancy services to the food processing factories but also repair, adjustments, and calibration of all kinds of instruments and process control equipment. The first step will be a modest but immediate set-up to help the damaged factories as quickly as possible. Later on, the Centre will be led to a position to introduce modern state-wide automation techniques in the food processing industries.

AGRA- UNO HYDROTECHNIK, Essen, F.R.G., was requested by UNIDO contract to advise the Romanian Authorities for the purpose. Mr. Baumgarten carried out the field work, Mr. Bruno Marsch the work at the Essen office. Execution period was from August to October 1972.

OFFICIAL CONTACTS DURING PROJECT WORK

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ABBREVIATIONS USED:

M.A.A.I.A. = Ministerul Agriculturii Industrii Alimentare și Apelor
(Ministry for Agriculture, Food Industries and Water)

D.I.A. = Departamentul Industrii Alimentare
(Food Industries Department)

G.I.U.C.I.A. = Grupul de Intreprinderi de Utilități al Construcției pentru Industria Alimentară
(Group of Enterprises for the Equipment and Construction of Food Industries)

I.C.P.A. = Institutul Cercetări și Proiectări pentru Alimentare
(Research and Projecting Institute for Food Industries)

A. ANALYSIS OF PRESENT CONDITIONS

1. Analysis of Present Conditions of Process Control Techniques in the Food Industries

At the beginning of field work, the following factories were visited:

- IAPŞIA, B u f t e a, tin ware factory
- Fabrica de Conserve "11 Junie", Dej, tinned food factory (vegetables and fruit)
- Fabrica de Zahăr, Ludus, sugar factory
- Fabrica de Lapte, Ludus, dairy and milk powder factory
- Fabrica de Conserve ZAGNA-VADENI, Galaţi, tinned food factory
- Industrie Carnii, Galaţi, slaughter-house and salami sausages factory
- Fabrica de Conserve MUNCA, Ovidiu, tinned food factory (vegetables and fruit) PEPSI-COLA
- Fabrica de Bere, Constanţa, malt factory and brewery
- Fabrica de Ulei, Constanţa, vegetable oil factory
- Fabrica de Lapte, Constanţa, dairy

It was found that the status of instrumentation depends mainly on the

- origin of the complete factory or production line, as the supplier normally uses his proven instrumentation scheme of measuring and control equipment
- life-span of factory or production line as with advancing usage instrumentation breaks down by quite normal wear and tear
- degree of skill and experience of operating and servicing personnel
- repair facilities

Generally speaking, the repair facilities have been found very poor. For the individual factories it is nearly impossible to get original spare parts, much less to keep any of them in stock. Besides, the skills and experience of the technicians need to be improved. The workshops are not equipped properly.

A detailed description of the instruments used in the factories of the Romanian food industries can be found in paragraph 5.

2. Present Status of Control Techniques in Damaged Factories

The flood disaster in Romania occurred in mid-May 1970. Nearly all the country was affected. Especially the food industries had been heavily damaged. At the sugar factory of Ludus, which was visited, nearly all process control equipment had been under water for a long time.

This was two and a half years ago, and the Romanian food industries now are going to have their third production campaign. In the meantime, process control equipment damaged by the floods has been scantily repaired or replaced, so that the problem of the damaged factories meanwhile has lost part of its urgency.

3. Urgent Action Programme for Damaged Factories

As outlined before, the problem of the factories damaged by the floods in 1970 is no longer so urgent that it needs special and separate remedy. However, an action programme is necessary:

- One of the (later herein) proposed three mobile service groups should be established immediately.
- Provisional repair facilities should be provided, especially a stock of the most common spare parts.
- First priority of the hiring of an UNIDO expert in repairing and calibration instruments.

The expert should first act as team leader of the "flying squad", then as the head of all three mobile groups, and finally as the head of the Centre's workshops including the mobile groups and the administration of the spare part magazine. During his entire activity in Romania, he should train the workshop and spare part stock personnel.

The first emergency service for the damaged factories is to be considered the first phase of the establishment of the future "Centre" and not as an independent programme.

4. Survey of Romanian Food Industries

In Cooperation with G.I.U.C.I.A., the Group of Enterprises for Equipment and Construction of Food Industries, the following survey was compiled. It should help to estimate the capacity of the planned CENTRE FOR AUTOMATION OF FOOD INDUSTRIES. (For the instruments involved see paragraph A.5)

4.1 SUGAR

There are 13 sugar factories in Romania. About 50 % of these factories are old ones with very little instrumentation and process control equipment. It is planned to modernize them with Polish (licence SIEMENS) and Romanian (licence HOKUSHIN, H & B and GULDE) process control equipment.

- 4.1.1 ARAD (district ARAD); old factory with minimum instrumentation;
- 4.1.2 SASCUT (district BACAU); old factory to be modernized;
- 4.1.3 ORADEA (district BIHOR); modern factory of German origin with SIEMENS instrumentation;
- 4.1.4 BUCECEA (district BOTOȘANI); modern French factory with MASONEILAN (WORTHINGTON) instrumentation and process control equipment;
- 4.1.5 BOD (district BRAȘOV); old factory to be modernized;
- 4.1.6 BUZĂU (district BUZĂU); modern German factory with SIEMENS instrumentation. Diffusion tower from GDR with GDR pneumatic control equipment;
- 4.1.7 CRAIOWA-PODARI (district DOLJ); East German factory built in the fifties with instrumentation from the GDR;
- 4.1.8 GIURGIU (district ILFOV); old factory to be modernized;
- 4.1.9 TIRGU MUREȘ (district MUREȘ); modern German factory with SIEMENS instrumentation;

- 4.1.10 LUDUS (district MUREȘ); modern French factory with MASONILAN (NORTHINGT.) instrumentation;
- 4.1.11 ROMAN (district NEAMȚ); old factory to be modernized;
- 4.1.12 CORABIA (district OLT); modern German factory with SIEMENS instrumentation;
- 4.1.13 TIMIȘOARA (TIMIȘ); old factory to be modernized

Most of the sugar factories have small repair shops for electric equipment, but there it is nearly impossible to repair process control equipment.

4.2 Vegetable Oils

There are numerous vegetable oil factories in Romania, mainly processing sunflower seeds. The most important are:

- 4.2.1 ORADEA (district BIOR); modern Belgian installation. Instrumentation and process control equipment FISCHER & PORTER (USA), TAYLOR INSTRUMENTS (USA), SIEMENS, I.C.ECKARDT, MANGELS (GERMANY);
- 4.2.2 CONSTANȚA (district CONSTANȚA); modern Belgian installation, instrumentated like ORADEA;
- 4.2.3 CRAIOVA (district DOLJ); modern Belgian installation. Instrumentation like 4.2.1 and 4.2.2;
- 4.2.4 GALAȚI (district GALAȚI); old factory;
- 4.2.5 SLOBIZIA (district IALOMIȚA); modern Belgian installation, instrumentated like 4.2.1;
- 4.2.6 IAȘI (district IAȘI); modern Belgian installation, instrumentated like 4.2.1;
- 4.2.7 SATU MARE (district SATU MARE); old factory;
- 4.2.8 ROȘIORI DE VEDE (district TELEORMAN); old factory;
- 4.2.9 BIRLAD (district VASLUI); old factory;
- 4.2.10 BUCUREȘTI; old factory;
- 4.2.11 BUCUREȘTI; "MUNTENIA", modern Belgian installation, instrumentation like 4.2.1.

4.3 Beer, Spirits, Yeast, Starch

There is a remarkable production of beer and spirits in Romania. Spirits factories are mostly connected with production of feeding yeast and starch. Modern brewery installations have been imported from Germany, malt factories from the GDR. The most important factories are:

- 4.3.1 ARAD (district ARAD); spirits and feeding yeast. Instrumentation I.C.ECKARDT (GERMANY);
- 4.3.2 PITESTI (district ARGES); modern beer brewery (from Germany), instrumentation SIEMENS (Germany);
- 4.3.3 BACĂU (district BACĂU); modern beer brewery, installations and instrumentation like 4.3.2;
- 4.3.4 ORADEA (district BIHOR); modernized beer brewery (GDR), instrumentation from GDR;
- 4.3.5 BRAȘOV-DIRSTE (district BRAȘOV); modernized beer brewery (like 4.3.4);
- 4.3.6 BRĂILA (district BRĂILA); old beer brewery;
- 4.3.7 CLUJ (district CLUJ); old beer brewery;
- 4.3.8 CONSTANȚA (district CONSTANȚA); Modern beer brewery (German), malt production (GDR). Instrumentation SIEMENS, METRAMATT (Germany), MERTIK, MAW (GDR);
- 4.3.9 TIRCU SECUIESC (district COVASNA); old spirits factory, modern starch production (German);
- 4.3.10 CRAIOVA (district ARAD); modern beer brewery (like 4.3.8);
- 4.3.11 GNIDIGENI (district GALAȚI); old spirits factory with modern feeding yeast production; instrumentation I.C.ECKARDT (Germany);
- 4.3.12 REGHIN (district MUREȘ); modern beer brewery (GDR); instrumentation from GDR;
- 4.3.13 IAȘI (district IAȘI); old beer brewery;
- 4.3.14 BAIA MARE (district MARAMUREȘ); modern spirits factory;
- 4.3.15 TURNU SEVERIN (district MĂDĂRĂȘ); old spirits factory.

- 4.3.16 PIATRA-NEAMI (district NEAMI); modernized beer brewery (GDR), minimum instrumentation;
- 4.3.17 PLOIESTI (district PRAHOVA); modern spirits factory;
- 4.3.18 SIBIU (district SIBIU); modernized beer brewery, minimum instrumentation (SAMSON, Germany);
- 4.3.19 SOLCA (district SUCEAVA); old beer brewery with modern refrigeration installations;
- 4.3.20 TIMIȘOARA (district TIMIȘ); modern beer brewery (Germany), instrumentation SIEMENS (Germany);
- 4.3.21 BUCUREȘTI "RAHOVA"; modernized beer brewery (GDR), instrumentation FEA (Romania);
- 4.3.22 BUCUREȘTI "GRIVIȚA"; old beer brewery.

4.4 Milk and Milk Products

There are dairies in nearly every town, the biggest are:

- 4.4.1 BRĂȘOV (district BRĂȘOV)
- 4.4.2 CLUJ (district CLUJ)
- 4.4.3 GALAȚI (District GALAȚI)
- 4.4.4 SIBIU (district SIBIU)
- 4.4.5 SIGHIȘOARA (district MUREȘ)
- 4.4.6 SUCEAVA (district SUCEAVA)
- 4.4.7 TIMIȘOARA (district TIMIȘ)
- 4.4.8 BUCUREȘTI

These installations are from Denmark or the F.R.G. Some of the dairies include facilities for milk powder production, so

- 4.4.9 LUDUS (MUREȘ) and
- 4.4.10 REMEȚEA (BIHOR)

The instrumentation and process control equipment is generally from DREYER, ROSENKRANS & DROOP (F.R.G.) but also from MERTIK (G.D.R.).

4.5 Meat and Meat Preparations

There are over 200 establishments preparing meat and making sausages for the local market. The main slaughter houses (with refrigeration) are:

- 4.5.1 BACĂU (district BACĂU)
- 4.5.2 SALONTA (district BIHOR)
- 4.5.3 BRAȘOV (district BRASOV)
- 4.5.4 CONSTANȚA (district CONSTANȚA)
- 4.5.5. TURNU SEVERIN (district MEHEDINȚI)
- 4.5.6 GALAȚI (district GALAȚI)
- 4.5.7 IAȘI (district IAȘI)
- 4.5.8 SINAIA (district PRAHOVA)
- 4.5.9 MEDIAS (district SIBIU)
- 4.5.10 SIBIU (district SIBIU)
- 4.5.11 ȘCHEIA (district SUCEAVA)
- 4.5.12 BUCUREȘTI

Standard process control equipment

in refrigeration centres: DANFOSS (Denmark)

in sausage production (salami) for air-conditioning: SAUTER (Switzerland) and FEA (Romania)

4.6 Canning

Vegetables and Fruit

- 4.6.1 TECUCI (district GALAȚI)
- 4.6.2 ZAGNA-VĂDENI (district BRĂILA)
- 4.6.3 CALAFAT (district DOLJ)
- 4.6.4 CARACAL (district OLT)
- 4.6.5 FETESTI (district TALOMIȚA)
- 4.6.6 VALEA-ROȘI (BUCUREȘTI)
- 4.6.7 DEJ (district CLUJ)
- 4.6.8 BAIJA MARE (district MARAMUREȘ)
- 4.6.9 VALEA LUI MIHAI (district BIHOR)
- 4.6.10 ARAD (district ARAD)
- 4.6.11 HĂTEG (district HUNEDOARA)
- 4.6.12 MUREȘENI (district MUREȘ)
- 4.6.13 VALENII DE MUNTE (district PRAHOVA)
- 4.6.14 BAICULEȘTI (district ARGHEȘ)
- 4.6.15 TOPOLOVENI (district ARGHEȘ)

Meat

- 4.6.16 SALONTA (district BIHOR)
- 4.6.17 MEDIA (district SIBIU)
- 4.6.18 SIBIU (district SIBIU)
- 4.6.19 TIMIȘOARA (district TIMIȘ)
- 4.6.20 BUCUREȘTI

Fish

- 4.6.21 TULCEA (district TULCEA)

Milk

- 4.6.22 BARAOLT (district COVASNA)
- 4.6.23 LUDUS (district MUREȘ)
- 4.6.24 REMETEA (district BIHOR)

4.7 Flour, Bakery and Flour Products

Large flour mills (capacity over 100 tons per day) at

- 4.7.1 CRAIOVA (district DOLJ)
- 4.7.2 BRAILA (district BRAILA)
- 4.7.3 TIMIȘOARA (district TIMIȘ)
- 4.7.4 ORADEA (district BIHOR)
- 4.7.5 IAȘI (district IAȘI)
- 4.7.6 BRAȘOV (district BRAȘOV)
- 4.7.7 BUZAU (district BUZAU)
- 4.7.8 ARAD (district ARAD)
- 4.7.9 BACAU (district BACAU)
- 4.7.10 CONSTANȚA (district CONSTANȚA)
- 4.7.11 ALEXANDRIA (district TELEORMAN)
- 4.7.12 BUCUREȘTI

There are modern large bakeries (with tunnel ovens)

- 4.7.13 BRAȘOV (district BRAȘOV)
- 4.7.14 CRAIOVA (district DOLJ)
- 4.7.15 CONSTANȚA (district CONSTANȚA)
- 4.7.16 GALAȚI (district GALAȚI)
- 4.7.17 TIMIȘOARA (district TIMIȘ)
- 4.7.18 BAIA MARE (district MARAMUREȘ)
- 4.7.19 BUCUREȘTI

Flour mills have few process control equipment.

Bakeries have tunnel ovens with pneumatic temperature control systems (HONEYWELL, USA and others).

4.8 Tobacco

There are curing plants in main tobacco growing areas.
No automation.

The cigarette factories at

BUCUREȘTI

CLUJ (district CLUJ)

IAȘI (district IAȘI)

RIMNICU SARAT (district BUZĂU)

TÎRGU JIU (district GORJ)

TIMIȘOARA (district TIMIȘ)

have their special automation problems mainly on
packaging and transportation. They have their own work
shops.

4.9 Wine

In the main growing areas are big wine processing and
bottling plants with no process control installations.

4.10 Tin Factories

There are two tin factories at BUFTEA and TECUCI which
supply the canning industries. They have pneumatic tem-
perature control systems from Honeywell and temperature
measuring and recording instrumentation from Dreyer,
Rosenkranz & Droop and Müller & Weigert, both F.R.G.

5. Instruments and Process Control Equipment in Romanian Food Industries

Basing on visitations, the above survey, and discussions with the Romanian authorities, the following preliminary inventory of the existing instrumentation has been elaborated:

mechanical controls without auxiliary power supply

about 800 for temperature	SAMSON	FRG
	MERTIK	GDR
about 600 for pressure	SAMSON	FRG
	MAW	GDR
	JUCKER	CSR

and about 200 valves with float action

about 400 pressure reducers for auxiliary air

pneumatic control systems with integrated measuring device

about 280 for temperature	DRD	FRG
	SAMSON	"
	TAYLOR	INSTRUMENTS USA
about 100 for temperature with programming installation	MERTIK	GDR
about 50 for pressure	SAMSON	FRG
	TAYLOR	USA
about 100 for pressure with programming installation	MERTIK	GDR

pneumatic control systems with transmitter for temperature, pressure, differential pressure, and level

about 300	SIEMENS	FRG
	I.C.ECKARDT	FRG
	PAP FALENIA	ROMANIA
about 50 for temperature with electric input	SIEMENS	FRG

electric control systems with integrated measuring device

about 600 for temperature, pressure, humidity	SAUTER, SWITZERLAND
---	---------------------

electric control systems with indicator

about 400 for temperature and humidity (LiCl)

AEG	FRG
H&B	FRG
SIEMENS	FRG

electric control systems with transmitter for temperature, pressure, differential pressure, flow, level density, pH, conductivity, humidity

about 200

SIEMENS	FRG
FEA	ROMANIA

mechanical indicators and recorders

about 100 for temperature and pressure

MERTIK	GDR
DRD	FRG
ICE	FRG

about 300 id. circular chart recorders

TAYLOR	USA
--------	-----

about 650 for differential pressure (flow) with integrator

BOPP & REUTHER	FRG
SIEMENS	FRG
JUNKALOR	GDR

electric indicators and recorders

about 800 crossed-coil instruments point and line recorders

SIEMENS	FRG
MAW	GDR

about 400 id. with moving-coil instr.

SIEMENS	FRG
WEGENER	GDR

about 60 compensograph recorders

SIEMENS	FRG
FEA	ROMANIA

analytical instruments

about 10 for gas analysis

SIEMENS	FRG
H&B	FRG

about 50 refractometers

ZEISS	GDR
-------	-----

about 40 electric colorimeters

LANGE	FRG
-------	-----

about 5 automatic polarimeters

SCHMIDT & HAENSCH	FRG
----------------------	-----

about 200 electronic balances

BARTORIUS	FRG
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electric and pneumatic control valves

about 3.000

B. RECOMMENDATIONS**PROPOSAL FOR THE ESTABLISHMENT OF A CENTRE FOR
AUTOMATION OF THE FOOD INDUSTRIES**

Romanian authorities have planned to establish a Centre for Automation of Food Industries. In its initial phase this Centre should provide facilities to repair, adjust, and calibrate the existing instruments and process control equipment. It should also act as buying agency for spare parts and, later on, for new instruments and control equipment.

Finally, the Centre should also provide documentation and consultancy services as well as training courses for operating and servicing personnel.

1. Location of Centre

It is recommended to erect the centre in or near Bucarest for the following reasons:

- The capital Bucarest is seat of government and most of its administrative and commercial agencies;
- Skilled personnel is more readily available in Bucarest than in any other part of the country;
- As the factories of the food industries are spread all over the country, Bucarest is also a good place in view of traffic communications.

2. General Building Requirements

For repair, adjustments, and calibration of instruments and process control equipment the following individual rooms are needed:

- | | |
|---|--|
| 2.1 electrical work shop (incl. armature winding) | ELECTRIC
REPAIR DPT. |
| 2.2 electronic work shop (incl. calibration of integrators and amplifiers for magnetic flow meters) | ELECTRIC
REPAIR DPT. |
| 2.3 non-ferrous room (mounting and repair of moving coil instruments) | ELECTRIC
REPAIR DPT. |
| 2.4 mounting and adjustment room for valves, switchboards, and control desks | ELECTRIC/
MECHANICAL
REPAIR DPT. |
| 2.5 calibration room for electric indicators, recorders, and controllers | ELECTRIC
REPAIR DPT. |
| 2.6 mechanical work shop | MECHANICAL
REPAIR DPT. |
| 2.7 welding shop (gas and electric welding, gas shielding, spot welding) | MECHANICAL
REPAIR DPT. |
| 2.8 precision mechanics shop pneumatic group | MECHANICAL
REPAIR DPT. |
| 2.9 precision mechanics shop - clockmakers group (mechanical recorders, mech. integrators) | MECHANICAL
REPAIR DPT. |
| 2.10 mercury room - mercury float type manometer (repair and calibration) | MECHANICAL
REPAIR DPT. |
| 2.11 mercury room - mercury type thermometers (repair and calibration) | MECHANICAL
REPAIR DPT. |
| 2.12 mercury room - store room
The functions described for rooms 2.10, 2.11, 2.12 could also be combined into one space. | MECHANICAL
REPAIR DPT. |
| 2.13 calibration room for pressure and differential pressure instruments (non-mercury types) | MECHANICAL
REPAIR DPT. |
| 2.14 calibration room for balances (incl. digital balances) | MECHANICAL/
ELECTRIC
REPAIR DPT. |
| 2.15 three room office (card index for instruments and process control equipment, reference library, catalogues collection, book-keeping, drawing office, project work, blue-print and xerocopy processing) | ENGINEERING/
COMMERCIAL
DPT. |
| 2.16 office for director | MANAGEMENT |

- | | |
|--|------------------------|
| 2.17 lecture room for information courses | ENGINEERING
DPT. |
| 2.18 laboratory for information courses and
internal use | ENGINEERING
DPT. |
| 2.19 two store rooms for raw materials,
prefabricated parts, imported spare parts,
instruments and process control equipment
(new and repaired) for exchange in cases
of emergency | COMMERCIAL
DPT. |
| 2.20 laboratories, dressing room | |
| 2.21 office and preparation room for mobile
service groups | MOBILE
SERVICE DPT. |
| 2.22 garages for service and utility cars | |

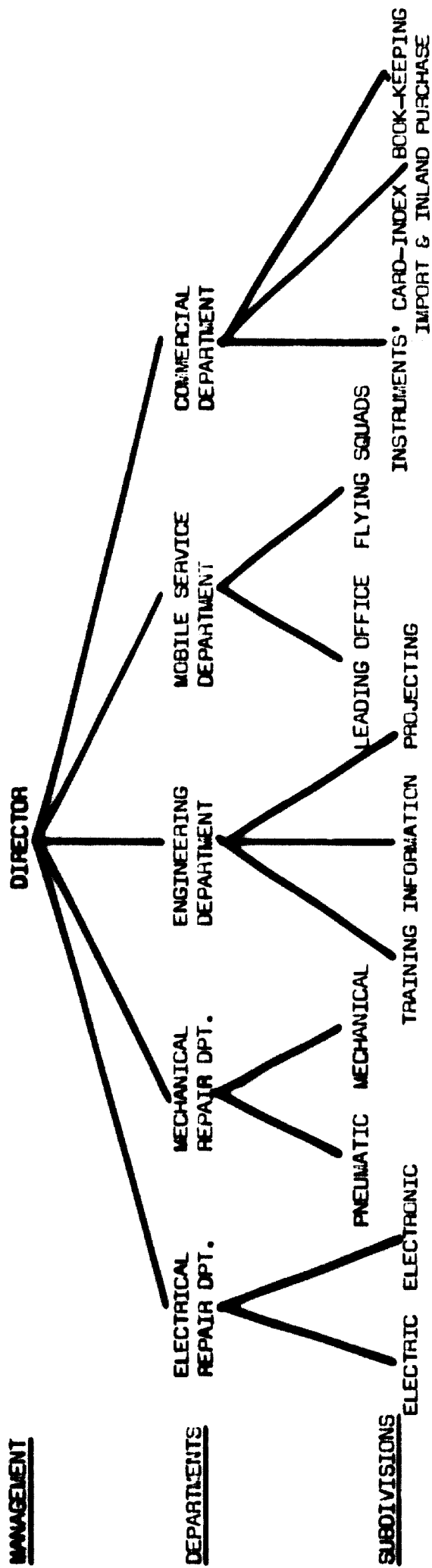
The recommended list of rooms is based on considerations concerning work processes, safety requirements, and separation of different functions to reduce interference due to dust, vibration, noise, etc. It is, however, possible by way of compromise to combine some of these rooms into common spaces.

The above listed 24 rooms 2.1 through 2.21 are estimated to comprise 20 to 50 square meters of surface each, the largest ones being 2.1, 2.4, 2.6, 2.21. Average size: 35 square meters. Total net surface required is estimated at about 850 square meters, garages excluded.

Government Contribution (see also page 28, 29, 30)

The Romanian Government is planning a new building for the Centre for Automation and Food Industries as no other accommodation for this centre is available in or near Bucarest. The construction work for the new building is supposed to start immediately after the planning is completed.

The construction time could be reduced by application of prefabricated construction. Prefabricated units have an axial distance of 6 meters. The construction of the shell will cost about 1000 Lei/m². Some of the interior walls should be movable to get the room size as actually required.



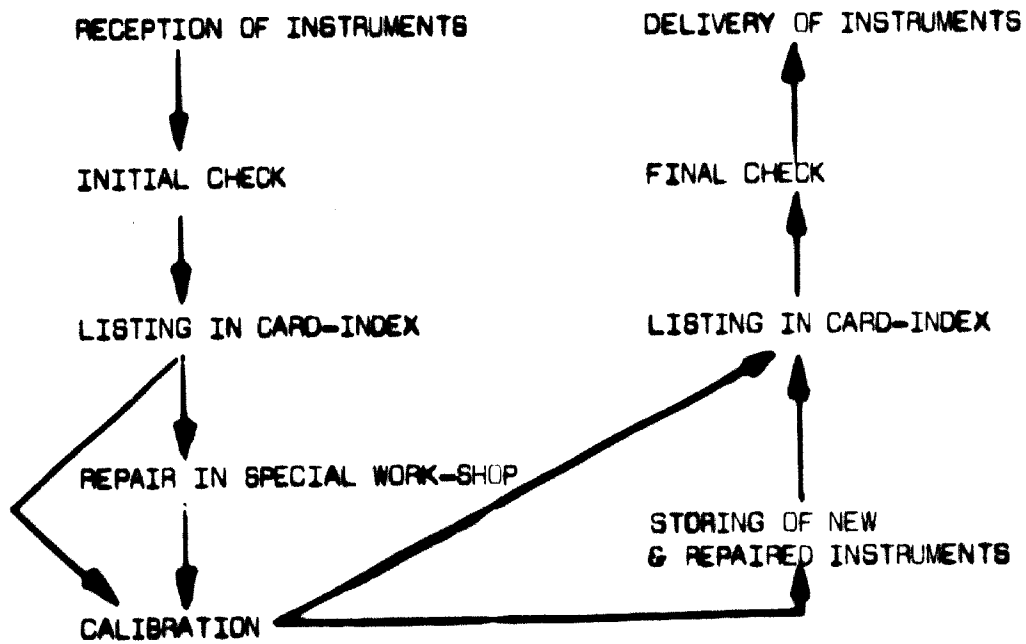
MANAGEMENT

DEPARTMENTS

SUBDIVISIONS

3. ORGANIZATION OF A CENTRE FOR AUTOMATION

3.1 WORKING SCHEME FOR INSTRUMENTS' REPAIR & CALIBRATION



4. Personnel Requirements

4.1 For the initial phase of the Centre, the following minimum personnel is needed (see also "Organisation" paragraph B. 3):

<u>Number</u>	<u>Qualification</u>	<u>estimated salary (Lei/month)</u>
1	managing director (engineer)	10,000 ... 15,000
4	engineers (heads of electrical, mechanical, engineering and service departments)	3,000 ... 6,000
12	technicians (heads of electronic, electric, pneumatic, mechanical, purchasing, documentation, subdivisions and members of the mobile squads)	2,000
1	director of commercial department	8,000 ... 12,000
10	clerks (all depts.)	1,200
20	skilled workers (all shops)	2,000
4	drivers for private cars or vans	1,800
2	secretaries	1,500

4.2 UNEP Fellowships

At the authorities in Bucharest, there are two fellowships pending for

1. Mr. Stefan Mertes, engineer at Research and Projecting Institute for Food Industries (ICPA)
2. Mr. Marcel Stoleru, engineer at Main Office for Meat Industries

As the Romanian Government wishes to have both fellows undertake their training programme together the following placements have been arranged as recommended by Mr. Baumgarten during his debriefing in Vienna:

host country	host firm	period
DENMARK	DANFOSS, Nordborg	1 month
FEDERAL REPUBLIC GERMANY	DREYER, ROSENKRANS & DROOP, Hannover	
	SCHMIDT & HAENSCH, West-Berlin	
	SAMSON APPARATEBAU AG, Frankfurt/Main	3 to 4 months in total
	I.C. ECKARDT AG, Stuttgart	
	C.O. MANGELS KG, Wilhelmshaven	
SWITZERLAND	SAUTER REGELTECHNIK	1 to 2 months
ITALY	MANZINI, Milano	

4.3 Further Fellowships

It is recommended to place six instrument mechanics for three months each at the following host companies:

FEDERAL REPUBLIC GERMANY	SIMMENS AG, Karlsruhe	2 fellows for 3 months
	DREYER, ROSENKRANS & DROOP, Hannover	1 fellow for 3 months
	I.C. ECKARDT, Stuttgart	1 fellow for 3 months
	SAMSON APPARATEBAU AG, Frankfurt/Main	1 fellow for 3 months
SWITZERLAND	SAUTER REGELTECHNIK	1 fellow for 3 months

These six fellows should have general information courses and thorough practical repair training.

The CENTRE will best benefit from the fellowship if all six fellows were members of its own staff.

4.4 UNIDO Experts

In addition to the fellowship it is recommended that UNIDO should provide

1 instrument chief engineer (counterpart to the Managing Director of the Centre)

1 experienced instrument technician (see A.3, page 6)

to serve as consultants at the CENTRE on a long-term basis.

5. Mobile Service Group

An essential part of the "Centre" will be the mobile service for the servicing of the installed instruments and closed control circuits in operation at the various factories. Also an emergency service is badly needed in food industries because of the perishable nature of their products.

In order to guarantee an immediate service, a minimum number of three mobile squads is suggested, each consisting of:

- one adjuster and calibrator
- one electrician and/or fitter } with driving licence

and three special tool cases of different assortment.

Excellent craftsmanship of the personnel is indispensable. Additional direct telephone lines are recommended.

Modified DAZIA vans would well meet the requirements of such a mobile service.

Whereas the service of mobile groups is considered the best "Urgent Action Programme for Damaged Factories" (see paragraph A.3), the establishment of such groups should be given first priority.

6. Tentative List of Equipment to be Provided by UNDP

	Quantity units	Unit price	total DM
one-button resistance measuring bridge	6	535	3.210
ampere-volt ohm-meter	6	315	1.890
micro amperemeter	3	470	1.410
milli voltmeter	6	335	2.010
isolation meter	1	560	560
work bench for mechanics	3		
ohm-meter	6	116	696
testing device for pressure and differential pressure transmitters	2	1.400	2.800
precision thermo-compensator	2	3.430	6.860
cathode-ray-oscilloscope	2	2.000	4.000
universal current and voltage supply max. 1 kV/10 A	2	1.045	2.090
instrument chuck (universal mounting device for panel instruments)	1	415	415
universal stand with support for recorders	5	535	2.675
foamed rubber sheet for placing sensitive instruments on work benches	5	50	250
latticed rubber sheet for placing sensitive heavy instruments on work benches	5	50	250
temperature alternating chamber for adjustments of thermo-compensating systems and for thermic aging of transmitters	1	9.100	9.100
small resistance measuring bridge (10 ⁻³ to 10 ⁶ ohms)	2	1.680	3.360
with zero galvanometer	2		
decade resistance (10 x 0.1 - 1 - 10 - 100 ohms) cl. 0.2	1	1.000	1.000
slide resistance (375 ohms, 3 A)	1	100	100
" (45 ohms, 3 A)	1	100	100
" (3.5 ohms, 5 A)	1	100	100

	Quantity units	Unit price	total DM
portable testing set for single and multi point recorders	1	870	870
portable calibration set for resis- tance thermometers and resistor type transmitters	1	1.700	1.700
solderings iron 70 W 50	5	50	250
id. 30 W 25	5	25	125
miniature soldering iron with special transformer 6 V, 6 W, for printed circuits 80	2	80	160
soldering pistol (100 W) 90	10	90	900
soldering accessories (supports, etc)	10	20	200
special tools for mechanics (approx. 100 parts)	6 sets	950	5.700
basic hand tools for workshop	1 set	4.000	4.000
non-magnetic tools (approx. 50 parts)	2 sets	250	500
special oils, grease, contact protectives (20 items)	1 set	200	200
adhesives, cements, sealing compounds (40 items)	1 set	200	200
portable pressure and vacuum testing set (0 to 500 mmHg)	2	1.210	2.420
portable pressure testing set	2	1.400	2.800
portable pneumatic testing set for TELEPNEU and other pneumatic transmitters	3	1.400	4.200
portable pneumatic testing set for TELEPNEU and other pneumatic con- trollers	3	1.400	4.200
manometer testing set	3	1.000	3.000
testing and calibrating bench for electric measuring and control ins- truments with electromagnetic systems (TELEPERM)	1	18.000	18.000
testing and calibrating bench for A.C. measuring and control ins- truments	1	16.000	16.000
testing and calibration bench for electric and pneumatic measuring and control instruments	1	20.000	20.000

	Quantity units	Unit price	total DM
fine wire coil machine	1	1.000	1.000
high speed precision lathe for small parts	1	2.000	2.000
precision manometer (0 to 0.6 bar) (class 0.6)	1	2.000	12.000
id. (0 to 1.0 bar)	1		
id. (0 to 1.6 bar)	1		
id. (0 to 10 bar)	1		
id. (0 to 25 bar)	1		
id. (0 to 63 bar)	1		
precision manometer (-1 to 0 bar) (class 0.1)	1	1.900	11.400
id. (0 to 1.0 bar)	1		
id. (0 to 2.5 bar)	1		
id. (0 to 6.0 bar)	1		
id. (0 to 10 bar)	1		
id. (0 to 25 bar)	1		
pneumatic accessories (approx. 100 parts)	6 sets	200	1.200
DANFOSS test panel, type SJ 0560 (for standard control equipment in refrigeration centres (see p.11))	2	1.250	2.500
<u>Mobile Service Group</u>			
tool case for adjuster	3	800	2.400
tool case for fitter	3	650	1.950
tool case for electrician	3	550	1.650
unforeseen			<u>8,099</u>
grand total			170.000

Items listed under paragraph 6 are in general not available in Romania. With this basic equipment, it will be possible to start work in the field of instruments' repair by the Centre's repair shops and by the mobile service group.

The Romanian government has already collected some 70 items, listed under the following paragraph 7, for use in the planned Centre for Automation. This list has been taken into consideration when the List of Equipment to be Provided by UNDP had been specified.

7. List of Equipment Already Provided
by Government

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	<u>origin</u>
distortion meter 20 to 20,000 c.p.s.	Poland
transistor meter 0 to 30 volts, 0 to 100 mA	C.S.R.
stabilizer for direct current 0 to 6 volts (10 A)	Hungary
idem 0 to 15 volts (5 A)	Hungary
stabilizer for direct current 220 volts	Poland
id. for a.c. 1 kVA	Poland
id. for a.c. 2 kVA 2 pieces	Poland
zero ohms meter	Hungary
voltmeter 0 to 1/3/10/30 mV/0.1/0.3/1/3 V $R_i = 10^{15}$ ohms	G.D.R.
synchroscope 0...5 · 10 ⁶ c.p.s.	G.D.R.
oscilloscope 2 pieces	Hungary
oscilloscope	C.S.R.
frequency generator 0.01 to 11,100 c.p.s.	U.S.S.R.
R.C. generator	Poland
frequency generator, voltmeter, ohmmeter	Hungary
frequency meter 50 to 20 · 10 ⁶ c.p.s.	Poland
frequency/voltmeter 2 pieces	Hungary
digital voltmeter	Hungary
micro voltmeter, selective 2 pieces	Poland
electronic voltmeter	C.S.R.
current transformer 0.5-1-2-10-50-100/5 A 2 pieces	C.S.R.
recorder, paper feed 1-25-50 mm.p.s. 0 to 0.1 - 10 V	G.D.R.
micro amperemeter 2 pieces 15-30 uA	C.S.R.
id. 75-150-300-750 uA 2 pieces	C.S.R.
milli amperemeter 25-50-100-150-500 mA 2 pieces	C.S.R.
electrodynamic amperemeter 1-2.5-5-10-25A 2 pieces	C.S.R.
milli voltmeter 60 mV / 10 ohms	C.S.R.
voltmeter 3 V / 1.500 ohms 2 pieces	C.S.R.
voltmeter 15/30/60 V 2 pieces	C.S.R.
voltmeter 150/500/600 V 2 pieces	C.S.R.
frequency meter panel type 45 to 120 c.p.s.	C.S.R.
electronic voltmeter class 0.2 6 pieces	C.S.R.

List of Equipment Already Provided
by Government

	<u>origin</u>
Galvanometer 10^{-7} to 10^6 A	Hungary
id. 10^{-6} to 10^5 A	Hungary
decade resistors 10^0 to 10^5 ohms 6 pieces	G.D.R.
decade condensers 30 pF to 12,221 F class 0.5	Hungary
compensators for a.c. 4 pieces	G.D.R.
resistance standard 0.001 to 100,000 ohms, 2 pieces	G.D.R.
secondometer 0 to 20 sec. and 0 to 200 sec. 2 pieces	G.D.R.
chronometer	U.S.S.R.
analytical balance 0.01 mg to 20 g	G.D.R.
pressure micrometer compensated type 0 to 150 mmWS	G.D.R.
ultrathermostat 20°C to $180^{\circ}\text{C} \pm 0.005^{\circ}\text{C}$	Hungary
rotometer for water 0.2 to 8.0 l/min	R.D.G.
id. for air 25 to 700 l/h	R.D.G.
conductometer with electrode	Hungary

Machine Tools

drilling machine MULTIMAX	R.D.G.
manual punching machine for 3 mm plates	Poland

Estimated value of all equipment
already provided by Government

200,000 Lei

8. Tentative List of Equipment to be Provided by Government**8.1 Complete equipment (machinery) for mechanical workshop:**

- 3 lathers for precision mechanics of different size
- 3 drilling machines of different size
- 1 small milling machine
- machine tools for sawing, cutting, grinding etc.
- work benches

8.2 complete equipment for:

- gas welding
- electric welding
- spot welding
- gas shielding

8.3 complete office equipment (typewriters etc) and furniture**8.4 technical library (books and periodicals)****8.5 storing facilities with complete stock of spare parts****8.6 three modified DASA vans as equipment for three mobile service groups****8.7 three cars for official use**

Estimated value of Tentative List of Equipment to be provided by Government

750,000 Lei

9. BUDGETARY COSTS

9.1 Project Budget Covering UNDP Contribution
(in US dollars)

9.11 Project Personnel Component	1973		1974		1975		Total	
	m/m	\$	m/m	\$	m/m	\$	m/m	\$
9.111 UNIDO expert, managing engineer	3	6,300	12	25,200	12	25,200	27	56,700
9.112 UNIDO expert, instrument technician	6	10,800	12	21,600	12	21,600	30	54,000
<u>9.12 Training Component (fellowships)</u>								
9.121 Fellow MERTECS	6	2,300						2,300
9.122 Fellow STOLERU	6	2,300						2,300
9.123 instrument mechanic	3	1,400					3	1,400
9.124 dto.	3	1,400					3	1,400
9.125 dto.			3	1,400			3	1,400
9.126 dto.			3	1,400			3	1,400
9.127 dto.			3	1,400			3	1,400
9.128 dto.			3	1,400			3	1,400
<u>9.13 Equipment Component</u>								
9.131 Expendable Equipment (5% per year of total 9.132) +)		1,250		2,250		3,000		6,500
9.132 Non-Expendable Equipment (s. p.27) +)		<u>25,000</u>		<u>20,000</u>		<u>15,000</u>		<u>60,000</u>
Grand Total 9.1		50,750		74,650		64,800		190,200

1 US dollar = approx. 3 DM

9.2 Project Budget Covering Government Contribution (in Lei)

	1973		1974		1975		Total	
	m/m	Lei	m/m	Lei	m/m	Lei	m/m	Lei
9.21 Project Personnel Component (see P. 22)								
9.211 managing director	6	75,000	12	150,000	12	150,000	30	375,000
9.212 4 engineers	24	120,000	48	240,000	48	240,000	120	600,000
9.213 12 technicians	36	72,000	144	288,000	144	288,000	324	648,000
9.214 commercial department director	6	60,000	12	120,000	12	120,000	30	300,000
9.215 10 clerks	12	14,400	48	57,600	120	144,000	180	216,000
9.216 20 skilled workers	24	48,000	96	192,000	240	480,000	360	720,000
9.217 4 drivers	24	43,200	48	86,400	48	86,400	120	216,000
9.218 2 secretaries	12	18,000	24	36,000	24	36,000	60	90,000
9.22 Training Component (see pages 22, 23)								
9.221 Fellowships (Maintenance of Trainees)	18	36,000	12	24,000	-	-	30	60,000
9.222 information courses, conferences		2,500		7,500		7,500		17,500
9.23 Equipment Component (see pages 28, 29, 30)								
9.231 Expendable Equipment		20,000		80,000		100,000		200,000
9.232 Non-Expendable Equipment		500,000		400,000		50,000		950,000
9.24 Building Component (s. p. 19)								
9.241 Construction		500,000		1,000,000		500,000		2,000,000
9.242 Service & Maintenance		20,000		60,000		100,000		180,000
Grand Total 9.2		1,529,100		2,741,500		2,301,900		6,572,500

10. General Work Programme for the Initial Phase

The "Centre" should be set up step by step in the following order:

- 10.1 Implementation of a Mobile Service Group of three squads. A central office, storage facilities for spare parts and tools, and garages in or near Bucarest are required. Provisional quarters are sufficient at this stage. Three modified vans and nine tool cases should be the first outfit.

Initial personnel:

- 1 UNIDO expert
- 3 precision mechanics
- 3 electricians
- 1 office clerk
- 1 storekeeper

Based on his field experience, the UNIDO expert should regularly review the project budget and submit his recommendations. It should also be the expert's responsibility to organize the setting up of the instruments' card-index.

Spare parts should be bought immediately at the request of the expert.

As soon as the first squad is complete, it should take up its activity in the "Urgent Action Programme" for the damaged factories.

The Mobile Group is intended to service instruments and process control equipment on the spot.

- 10.2 Soon after the beginning of the first activities of the Mobile Group, another UNIDO expert, this time a managing engineer for the establishment of the Centre, should commence the planning of the building, the definite choice of the equipment and the purchase of the latter.

At this stage, provisional quarters for the expert and the first staff are still sufficient.

- 10.3 - Establishment of repair facilities for pneumatic, electro-pneumatic, and electronic instruments and control equipment;
- Starting up of the repair and recalibrating service for equipment in such conditions that readjustment by the mobile groups on the premises of the factories is impossible;
 - Intensive training of the personnel in courses and lectures.

10.4 End of the provisional phase and

- establishment of the Centre in the proper buildings and premises;
- extension of the services and repairs to all kinds of instrumentation and control equipment;
- completion of the documentation (card-index register) for all measuring and control equipment existing in all factories of the Romanian food industries. This card index will be of great help for any planning and project work of the Centre. Every repair should be entered and a test certificate be given to the factories together with the repaired instrument. The food industries should preferably send in their out-of-order instruments for readjustment after they have finished their individual production campaign. New instruments and all spare parts should be purchased only through the Centre.

11. Long-Term Work Programme

After the initial stage, the Centre should offer information courses (lectures and practical courses) for the local servicing and operating personnel. These courses could be arranged during the non-campaign period of the food industries.

At a later date, the Centre should provide automation schemes for existing factories whose process control techniques need to be upgraded. It should also serve as consulting agent in the general field of automation in the food industries.

At this stage the library should be established and all pertinent periodicals ordered.

Routine work will include

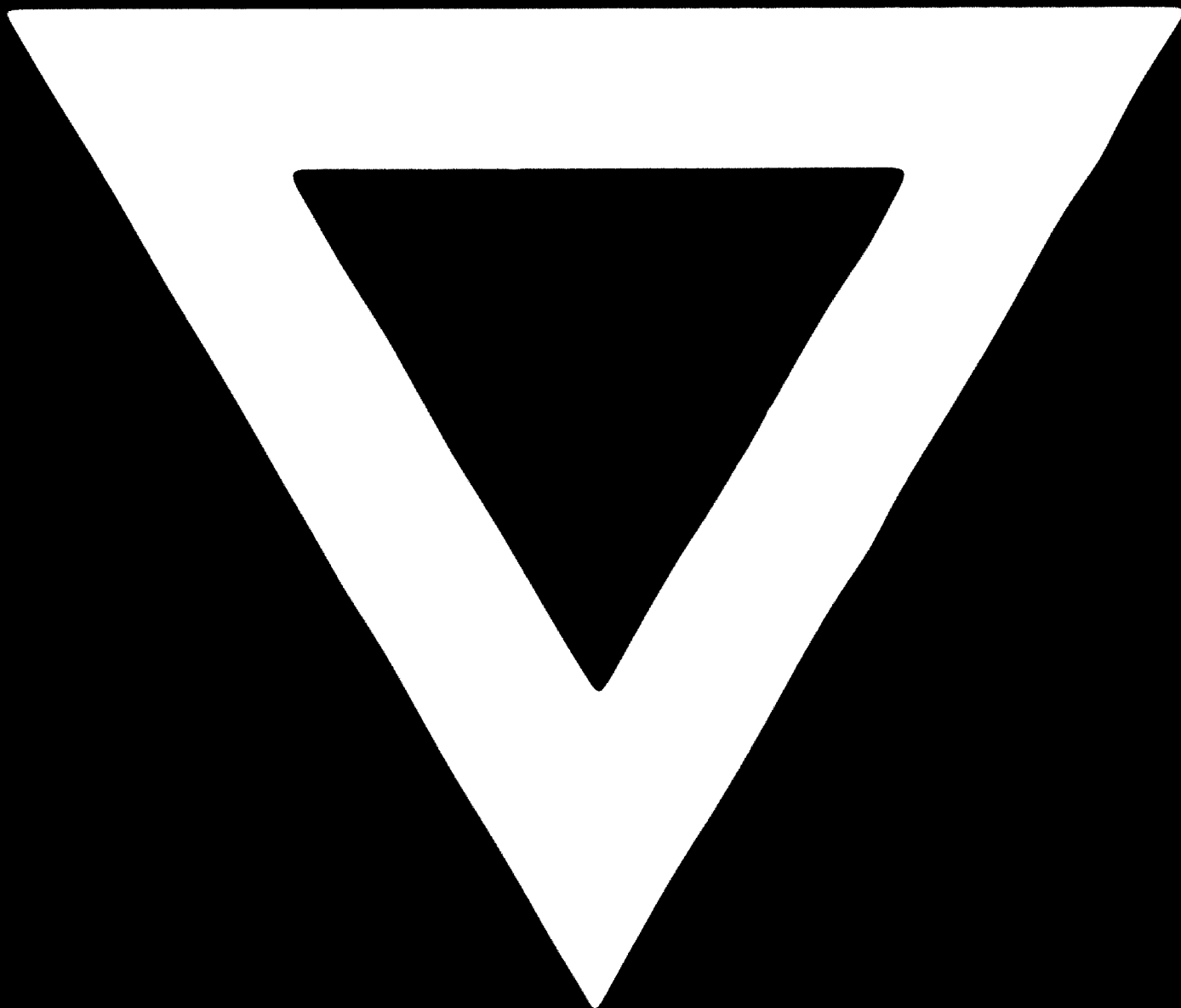
- repairs
- readjustment
- recalibration
- servicing

of all instrumentation and control equipment throughout the food industries.

- registration (documentation) of the existing instruments
- central purchase of instruments and spare parts
- project work and consulting services for the food industries



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