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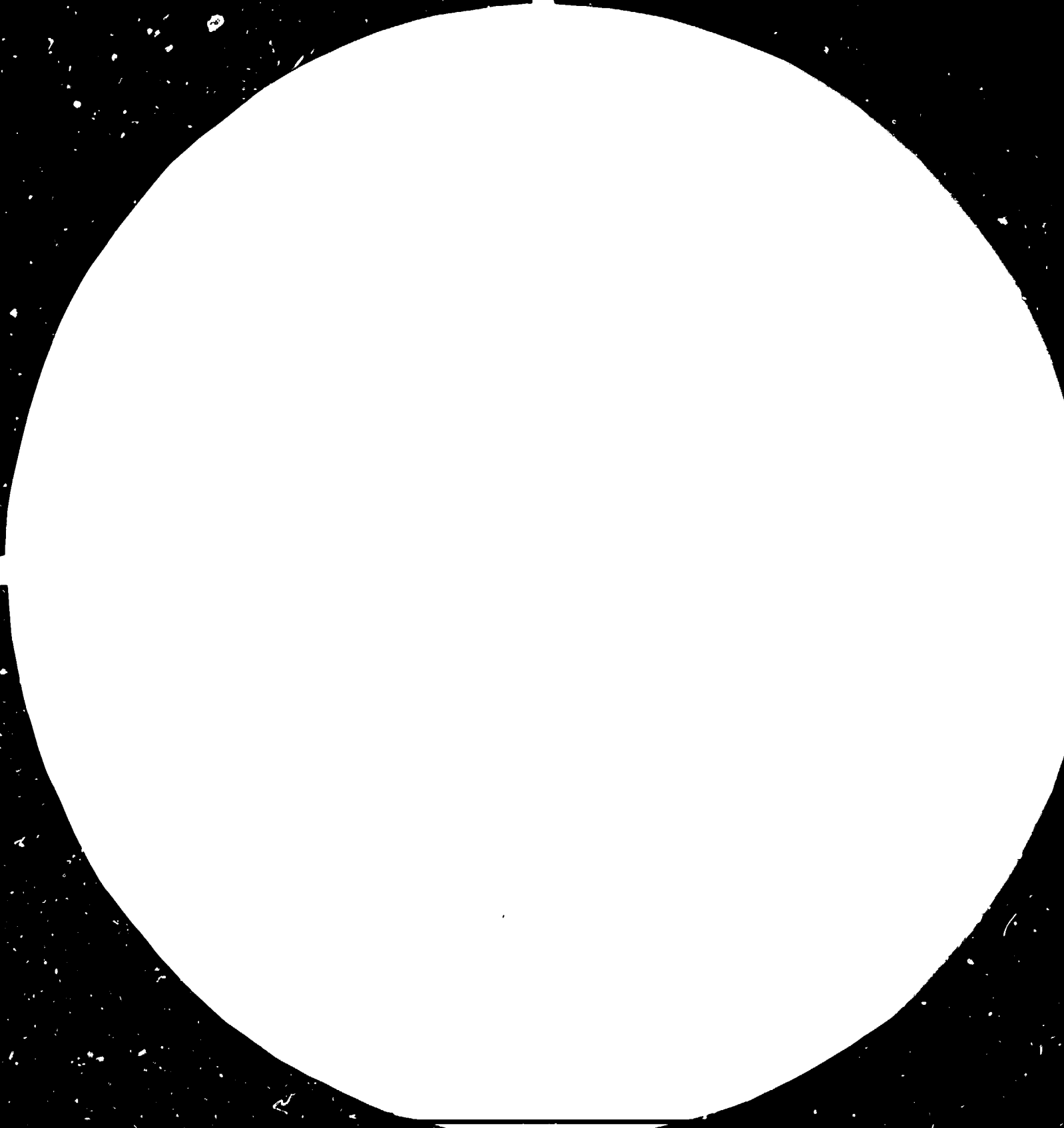

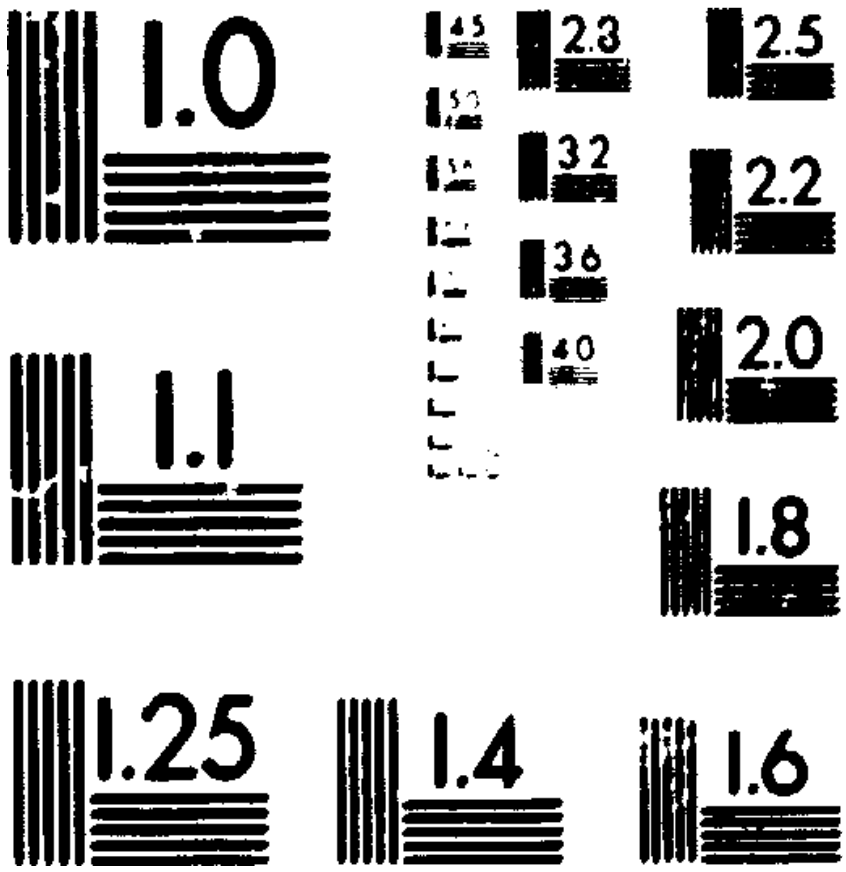

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DEVELOPMENT OF ELECTRONICS CAPABILITY IN MALTA

DP/MAT/83/001

MALTA

Technical report: Maintenance and Servicing of electronic Equipment in the Public Sector *

Prepared for the Government of Malta
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of the electronic experts Hans-Dieter Liess, Ronald E. Fischbacher and Edgar J. Stoehr

United Nations Industrial Development Organization

Vienna

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Abstract

The following report describes in general the progress made, up to this point, in the erection of an advanced electronic maintenance unit for the maltese government.

The recommendations made by UN - expert R. Fischbacher in his report, dated June 25th 84 are defined in detail.
Specific companies and their co - ordinators are named and suggestions are made for the setting up of a complete development and production line.

The education for engineers at the University of Malta is discussed as well as a proposal is introduced for revising the structure of the Department of Electrical Engineering.

This report is a suplementation and a continuation of the report already submitted by H.D.Liess and R.E. Fischbacher.

CONTENTS PAGE

1. The advanced electronics maintenance unit

1.1. Staffing

Mr. E. Stoehr, who will become head of the unit prospectivly for one year, starting September 1st, was introduced to the responsible persons of the programme.

The Government of Malta has now brought forth a detailed job - discription for the position of Mr. Stoehr's maltese counterpart, which is to be published June 23th 84 and distributed to all statal and parastatal organizations of Malta. Unfortunately, the dead - line for application to the above mentioned post was dated July 6th, 1984.

Thus Dr. Liess and Mr. Stoehr were not able to interview respectiv applicants during their stay in Malta (June 24th through July 8th). Due to this fact government higly recommended, that Mr. Stoehr travels to Malta again within the next 7 weeks to participate personally in the selection of a suitable counterpart. At the same time Mr. Stoehr would be able to finalize the selection of necessary equipment (refering to point 1.3. of this report). Should the circumstances require a delay, the interviews of the applicants could be held in early September. It is to be noted, that the final decision here upon will be made by the Government of Malta in agreement with Dr. Liess and Mr Stoehr.

Five students of the Fellenberg Institute have been selected to temporarily work with Mr. Stoehr. It has, furthermore, been determined, that other student workers of the University should participate in the program as co - workers with a total of up to five persons considered as appropriate. It is to be noted, that these individuals are yet to be selected.

1.2. Furniture and workshop

The furnishing of the workshop itself has progressed well. This pertains in particular to the refurbished items. The cabinets needed for the storage of precision measurement and testing equipment have been completed as well as the trolleys. They must, however, be reduced in hight, in order to meet the standart hight of the workbunches, which are to be used.

The workshop facility has been repainted and is ready for use, except the cabling. Prior to using the workshop the already existing 240 V cabling must be equiped with a seperate fuse and a leakage current detector.

The 6 testing stations planned are far progressed. The work surfaces

and the tops have not been mounted by now, but will be completed in the near future. The work surfaces have, furthermore, yet to be covered with 3 mm thick neoprene mats. Three of the workbenches must also be additionally equiped with specific antistatic material, to make the repair of MOS equipment possible. It has been assured, that the benches will be fully completed by September 1st, excepting the installations of electrical receptacles and the power connection by the unit itself, which is to be administered upon the arrival of Mr. Stoehr in September.

One of three of the original workbenches has been totally refurbished and will serve very well as an additional work bench. The other two benches will be refurbished in the same way prior to September and will thus enable an expansion of the existing work surfaces. Wall benches will also have been redone by this time.

Cabinets, furnished with small plastic drawers, which are to be used for the storage of small parts, are to be purched from the affixed total sum of £m 21000.- made available for procuring items listed by Mr. Stoehr on his material requirement list, dated June 25th.

Chairs remain a big problem. At this point the momentarily available wooden straiht back chairs must be used until swivel chairs have been acquired, which is not possible prior September 1st.

In order to operate the equipment and to maintain the accuracy of the equipment specifications for the installation of the air conditioning have been established. The air condition system will be installed in August, and put into operation by September.

1.3. Equipment

A call for local tenderers was published May 29th. The dead - line for submission has been set for mid - July. In reference to this call for local contractors by the government, it is again recommended, that Mr Stoehr participate in the final selection of the local contractor, who are to supply. A final solution in this respect must yet be agreed upon between the Government of Malta and the before said participating persons (as was previously mentioned in point 1.1. of this report).

Necessary small equipment, parts and tools, which singulary are not of essential value have been compiled in a list by Mr. Stoehr, which has been forwarded to the Government of Malta, who will have procured these small parts by September 1st.

1.4. Miscellaneous

In reference to the work load and the report procedure defined by R. Fischbacher in his report, dated June 25th 1984, the circumstances are to be considered as unchanged.

2. Industrial Expansion

2.1. Premises

Based upon the R. Fischbacher report, dated June 25th, 1984, specific industrial branches have been identified and determined suitable for Malta. In this respect it is a essential to distinguish between off shore production lines and complete firmes which entail development, production and sales. A readily available solution for Malta are definitely the off shore production lines, who are capable of yielding immediate results and job possibilities for the Maltese population. It should be noted, though, that they have the overall disadvantage of being unexpectedly pulled out of Malta. Companies run solely by the Maltese would yield the same results as a considerably later time and are thus represent only a long term solution, but it should here be noted, that they offer a graeter deperability and less risk.

2.2. Off shore production lines

In this respect semi conductor production, software production, medical electronics and ship electronics are to be taken into consideration.

As far as semi conductors are concerned it is to be stated, that there are two well functioning companies already present on the island: The SGS - Ates and Eurocomponents. Due to necessarily high developing investment costs and the disadvantages of Malta compared to other countries, trial offers in this field have been, to this date, without results.

Software production has been principally rejected by the Malta Development Corperation (MDC), because they are considered as insuffition.

The area of ship electronics and medical electronics appear to be a quite prospective field. Specific german companies manufacturing in this field, have been recommended by Dr. Liess including the persons, employed by the respective companies suitable for contact. A letter was formulated in cooperation with the MDC and sent to the just mentioned recommended firms.

Due to the fact that extreme limitation are present in the area of production the field car electronics (on board and service) appears to be a very promising area. Here, too, specific companies were determinated, with whom contacts should be made.

In the field of satellite communications electronics a number of companies have showed a great interest in a, so - called, technology transfer. An explosive development in this field of electronics is to be expected in the near future.

2.3. Complete manufacturing lines

Due to the necessarily arising development costs and thus to arising risks, this is to be considered a utmost difficult facit of the program, if the necessary experience is not present. In order to lower the risk factor and at the same time utilize the "Know - how" of the unit a special procedure has been proposed for the ddistribution of work areas. The following proposal should be taken as a possible example for discussion.

2.3.1. Procedure for a development programme

Upon request of a potential producer of electronic equipment, called customer, the unit will define a specific program for development up through the production stage itself. For this equipment development program different phases will be determined according to the probable marketing risks.

The costs of the development program are to be carried by the customer and are to entail the following:

- wages of co - workers
- over head charge
- material required
- shipping and correspondence costs

A first down payment is to be made upon completition of the defining phase, which will be quoted relativly low. A second down payment will be due from the customer upon their receipt of the developed prototypes. The balance of the costs is to be paid by the customer via a formally calculated amount, which is to be paid per each piece of equipment sold by the customer. Once the total costs of equipment development have been carried the previously formally calculated amounts per piece of developed equipment the amount due for payment with each piece of sold equipment may be reduced and recalculated according to the costs arising from a quality control, which is to be offered, and from the consistant updating program for the developed item.

The possibility of cancelling the item from the development program is eminent in nearly each phase of the program for both the customer and the unit.

The complete flow chart in this regard is listed in the appendix 1 of this report.

3. Higher Education in Electrical Engineering

Contacts at University:

Prof.Dr. Ludovit Kupka, Head
Dr. Charles Poole Department of Electrical Engineer.
Dr. Paul Micallef

Mr Laurence Ellul, Registrar

3.1. Present Staff, Buildings and Equipment at University

The university is nice by situated at Msida on top of a hill overlooking a part of the island. However, the two laboratories of the Electrical Engineering Department are still in the former polytechnical school several miles away.

At present the department has the following teaching staff:

1 full professor
3 senior lecturers
5 lecturers

With this number of people it is hardly possible to cover the teaching requirements for electrical engineering completely. In spite of this the results are still very satisfactoring, as the report of Prof. Shepard and Prof. Farris, the former external examiners, show and industry confirms. This can be only explained by special effords which the young and enthusiastic staff is able to supply.

For the present number of students the rooms available for lectures seems to be sufficient.

By european standart not adequate however are the laboratories. They are to far away, the equipment is by far out of data and does not cover the complete areas of electrical engineering.

3.2. Supply of engineers to the country

The present rate of supply is 50 to 60 electrical engineers per year.

To keep pace with Germany it should be 80, with Japan 200 per year (see report of Mr Fischbacher dated June 25th 1984).

Especially industry complaines bitterly about the lack of electrical engineers and claimes this as one of the reasons for the limitatios to further expansion (SGS, Eurocomponents).

3.3. Proposals for improvement

3.3.1. General

If Malta is willing to become an adequate partner of contries with developed technology it has to put more effort in the education of engineers. The following items should be discussed in the future.

Malta follows the british system of university education, but is only able to run courses for the bachelor grade. Master and doctor graduation has to be taken abroad.

3.3.2. Structure of the Department of Electrical Engineering

The department should be split at least into 4 institutes with 3 to 4 chairs. The proposal attached could be taken as basis for discussion.

The chairs should be filled with a professor or a senior lecturer. Each institute should at least have one full professor, independant which chair he holds. This professor should also be the head of the institute. If there are once more than one professor, the head - position could rotate in a two to four years cycle.

This system would require at least four full professors in the departments. One of these professors should be elected to become the head of department. This function should also rotate in a two to four year cycle.

3.3.3. Buildings

Each of the four institutes proposed requires at least one own room of adequate size for its laboratory. The institute (1) of Energetics needs even additional space for high voltage equipment and the

institute (4) for computer terminals.

To fulfill these requirements the University is asked to reconsider the plan of establishing a seperate building for the department. The first drawing, which have been already made by the architects of the university could be taken as basis for discussion.

3.3.4. Equipment

For purchase of the basic equipment an initial amount of at least £m 150,000 is required. The university should also take in consideration that technical faculties, like electrical, mechanical or civil engineering require a higher proportion of the budget, then non technical sciences.

3.3.5. Student worker scheme

The student worker scheme containing the study and workphase as well as the sponsorship is in principle a very good system. Since the start there exists now enought experience to revise the results. Some problems require an improvement, which have been raised already by the various bodies concerned but not settled yet. If the university wants to fulfill the requirement of the country, this revision should be initialed in due course.

3.3.6. Master and doctor degrees

Unless the university is not enlarged to great extend, it is strongly not advised to introduce a master course or even a possibility to get a doctor degree in Malta.

The present workload of the limitated senior staff (professors and senior lecturers) does not allow to put any effort into research or even some post - graduate courses. In addition to this, it would also require the laboratory space proposed and further equipment exceeding the amount of £m 150,000 already mentioned.

At present and even in the future it is by far more economic to have the further education abroad. In addition to this it would also avoid inbreeding, which is a great danger in the special case of Malta.

It would be advisable to develop a scheme to send the best students abroad for further education, however not only to Great Britain, but also to USA, other european countries and to Japan. This may also establish and tighten links with foreign industries.

3.4. Maltas role in education

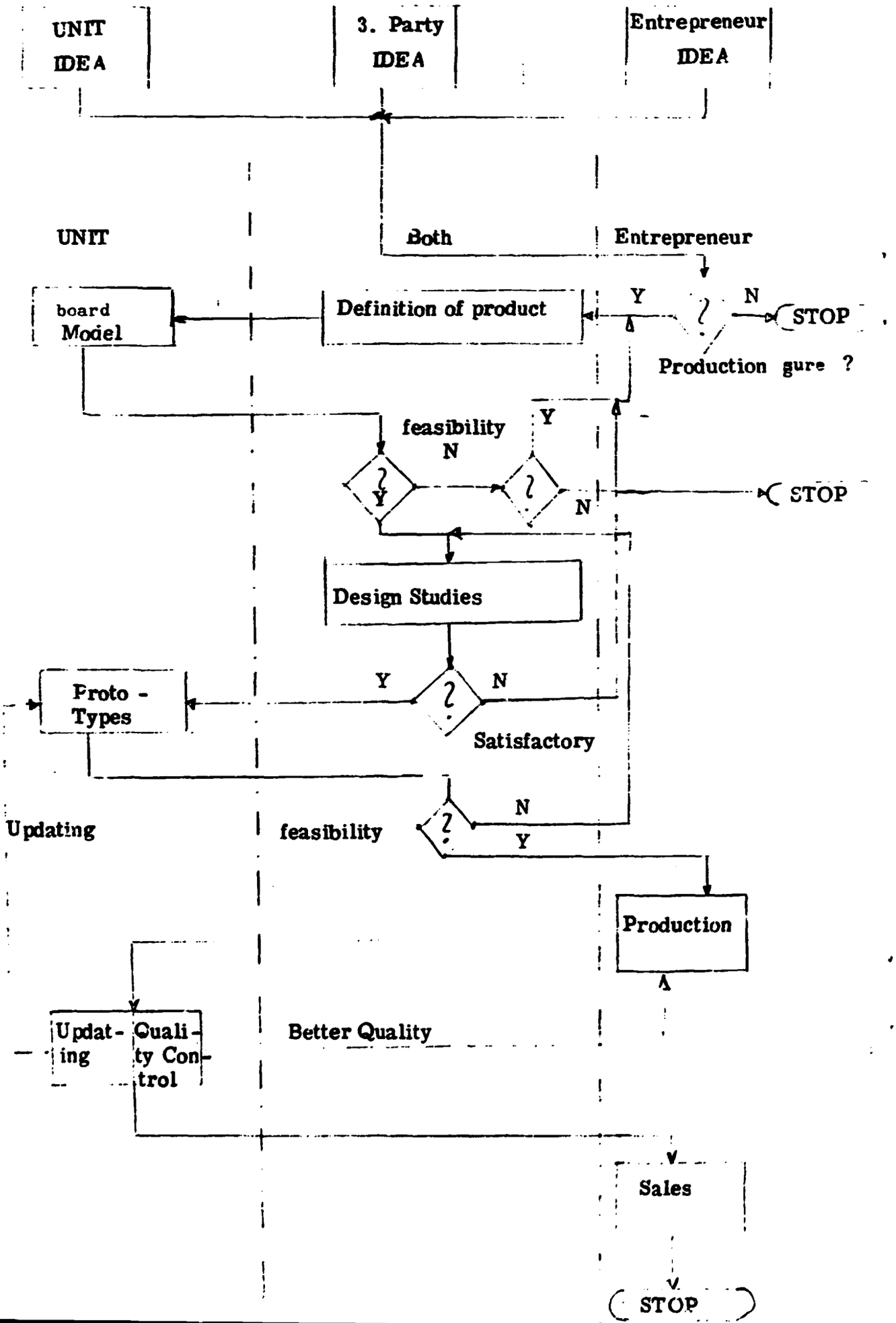
Malta has not used its potential of offering education as service to other countries yet. With the "Center of Excellence", which is presently considered by UNIDO, this could be achived in the area of technical education.

Following this pattern, it should be considered to open the university also to foreign students, which apply now in great number especially from the arabic countries around the Mediteraneum sea.

3.5. Social status of engineers

It is said that the social recognition of engineers in Malta is very low compaired to other contries. If this is generally true and one reason for the low interest of pupils to become engineers, the name "engineer" should be protected by the government.

DEVELOPMENT FLOW CHART



Appendix 2

Department of Electrical Engineering

1. Institute for Energetics

Chair: 1. Electrical machines and drives
2. Power transmission and distribution
3. High voltage technology

2. Institute for Basic Electrical Engineering

Chair: 1. General electrcal engineering
2. Theoretical electrical engineering
3. Scienca of control and instrumentation

3. Institute for Applied Electrical Engineering

Chair: 1. High frequency technology and microwaves
2. Electronic components and circuits
3. Industrial electronics

4. Institute for Information Technology

Chair: 1. Telecommunications
2. Computer architecture
3. Data processing