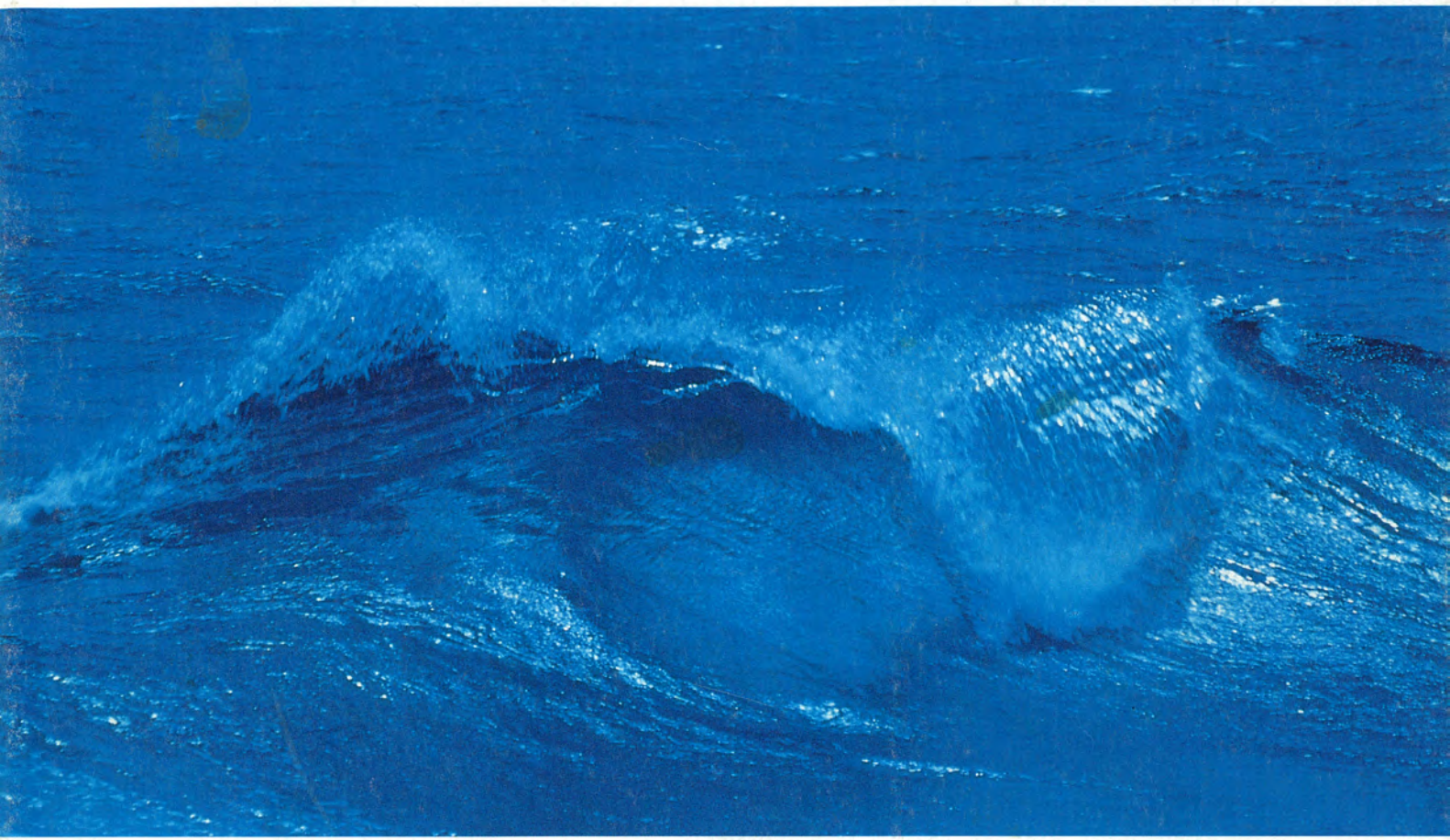
The world of SKANTI



1965-1990

SKANTI

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25 years - and the future has not yet begun

It is an achievement in itself for a firm to survive in a business where the electronic and technological changes have been so rapid. It is even more remarkable that SKANTI, based in a small country like Denmark, could achieve a position as the trendsetter in a world market. With products that customers want and competitors copy.

It surprises many people abroad that it should be Denmark that leads the way in short wave technology. But it is not really so surprising; small countries concentrate on their human resources and when these are combined with advanced technology in a product area regarded by many larger firms as a narrow niche, excellent results are achieved.

For 25 years, SKANTI has enjoyed the benefits of a Danish educational system which has produced development engineers of a high standard. Because of its proven record, both in terms of design and financial results, SKANTI has always been able to attract not only the cleverest but also the most enthusiastic employees.

These 25 years are but the beginning of a future that will place greater and greater demands on communication. Both at sea and on land - and between the two elements.

The two great challenges are the rapid rate of technological development and the coming of the single European market in 1992; a market which, with common certification procedures for many countries, will also be of interest to the giant firms that have formerly regarded it as a mere niche.

SKANTI is prepared for both challenges. The lead we have already achieved will be consolidated by considerable investment in new technological equipment and by a consumer-oriented marketing policy based on the extensive network of distributors which we already have.

Satellites will come to have increasing importance for communication over great distances and SKANTI is, therefore, already involved in development projects in this area. Satellites do not distinguish between water and dry land, so we are conscious of the importance of further developing land-based equipment.

In February 1991, SKANTI's new research and development centre will be ready for occupation. It is being established in the same building as the administrative headquarters so that the interplay between ideas, sales and business strategy will be strengthened in the exciting decade ahead. We believe that we can establish in the new centre the creative working environment for engineers that forms the basis of success for any project - including SKANTI's.

In 1992, the single European market will demand our attention and competition from outside Europe must also be expected. It is my personal opinion that the European maritime communications industry will have to give it serious thought and increasingly go in for cooperation and coordination. In the future, maritime communication and navigation equipment will be concentrated in a single command centre, served by as few personnel as possible, and it is very possible that such equipment will have to be supplied in a single block.

These thoughts are part of SKANTI's strategic planning and, in collaboration with our Belgian

parent company, SAIT, we intend to develop our marketing to meet the new challenges.

SKANTI's production unit in Frederikssund, Denmark is actively engaged in the application of the new production technology. Investments in the installation of new technology are constantly being made and, as soon as a new piece of technology has been run in, its successor is tested. SKANTI is a trendsetter in this area too.

The SKANTI market covers four main areas:

Deep sea: Here it will be a matter of concentrating on integrated communications centres with equipment tailored to suit the customer's needs. The new Global Maritime Distress and Safety System - on the way for more than 20 years - will involve considerable changes in the communications area.

Fishing: Especially within the Common Market, the quota system has meant a considerable reduction in the size of the fishing fleet. This is a situation which we expect will change in the course of three to five years. After that, there will be further growth, bringing orders for new ships and replacements. SKANTI understands the needs and conditions of the fishing fleet and when the time is ripe, we shall make good use of the technological advances which we have made in other sectors.

Pleasure craft: The new communication systems resemble the telephone equipment that we are all familiar with. The SKANTI VHF 3000 has already made a great impact on this segment of the market and the TRP 7000 is well on the way. They have set a trend that has aroused interest on the very extensive foreign market.

Peter Vange, Managing Director of SKANTI since 1 April 1986.

Point-to-point: Especially with the TRP 8000, SKANTI has created products that are able to communicate across great land distances. They are used, among other things, for communications between embassies abroad and ministries at home, as well as for military and paramilitary purposes. The dependable communication provided by this HF equipment will not be taken over by the more vulnerable satellites, so here, too, SKANTI will continue to make its mark.

SKANTI has an optimistic view of the future and of the many challenges that it will present. To our customers, owners and employees I can say that after 25 years, SKANTI is still young and dynamic and will continue for many years yet to be a leader among those companies around the world which are involved with maritime communication. To the advantage of those employees who, in SKANTI, have found a good and interesting workplace.

I should like to take this opportunity of thanking the customers, owners and employees for my five of those 25 years.

Peter Vange
Managing Director

There's a story behind the history of SKANTI

When SKANTI was founded in 1965, nobody knew who was behind it.

The share capital of 200,000 DKK had been spent the very next day but today, SKANTI's equity capital stands at more than 25 million DKK.

The basis for this success lay in the Second World War. Subsequently there is the amazing story of an imaginative engineer and businessman who suddenly found himself face-to-face with 700 Gibson Girls in a Munich hangar.

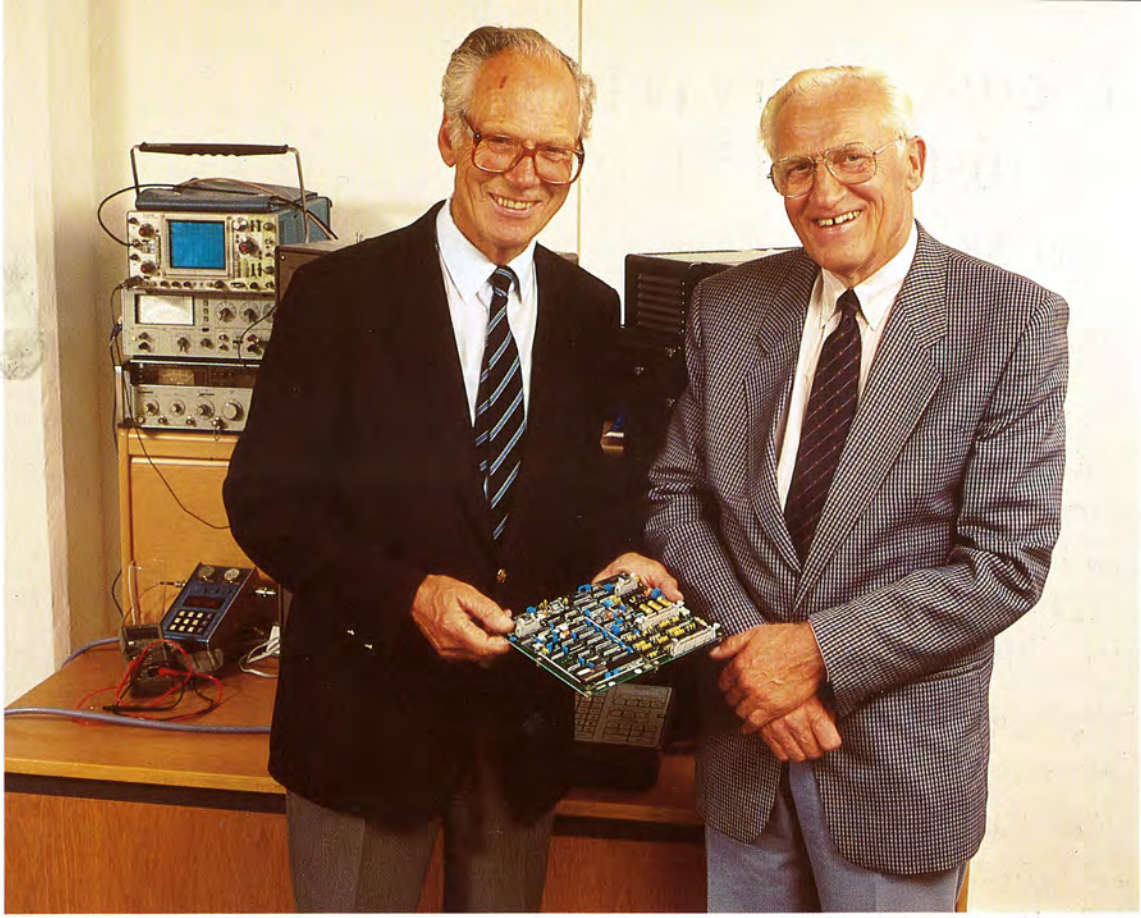
Skandinavisk Teleindustri Skanti A/S was founded in 1965 but some of the activities and personalities who have set their mark on the 25-year success story had made a good start several years earlier.

Developments on the product side since 1965 are recorded elsewhere. But who were the people behind SKANTI and how did it all get started?

In connection with the jubilee, we met two of the persons who were making their mark on the Danish electronics industry long before the establishment of SKANTI and who later played leading parts in the SKANTI story for many years.

They are J. K. Kristensen (JKK) and Peder C. Beyer (PCB). Here are their stories about SKANTI, its birth and growth, and the joys, which outnumbered the anxieties.

PCB: In order to understand later developments, we must go all the way back to 1948. That was the year when the London Safety Convention decided that from the beginning of the 1950s, all large ships should have at least one emergency transmitter/receiver for use in a lifeboat. At that time I was head of DISA Elektronik which had designed and produced frequency meters and short wave transmitters for the army signals service. Carl F. Sørensen, our sales manager, who later became a central figure in SKANTI, got the bright idea that we, too, should manufacture emergency transmitters for this new, large market.



Peder C. Beyer

10 September 1974: Elected to the Board of SKANTI A/S

20 May 1981: Chairman of the Board

1 January 1983: Leaves the post of Chairman but continues as Board member

31 December 1985: Retires from the Board

J. K. Kristensen

1 November 1965: Nominee director of SKANTI A/S

20 April 1976: Elected to the Board (Chairman)

1 January 1979: Vice-Chairman of the Board

1 January 1980: Chairman of the Board

18 May 1981: Managing Director of SKANTI A/S

1 January 1983: Leaves the post of Managing Director and becomes Board Chairman

31 December 1985: Retires from the Board

To help with the design we hired an engineer, Anker Bølling, and an instrument maker, Bent Bendixen. Both later came to SKANTI and Bendixen is still there. We didn't know much about emergency transmitters, but we had an idea that we could learn something if we could get hold of the hand-operated transmitter which American airmen had used in the Second World War. It was known as "the Gibson Girl". It was the transmitter case and the generator that we wished to use. The transmitter/receiver and the modified, automatic keying device we designed ourselves. The result was a good piece of equipment and we bought up all the Gibson Girls we heard of. In the course of time, I have personally bought probably 15,000 "girls", but at the beginning we could only find a few at a time.

I had found out that there was likely to be a number of them in store in Munich and went there to have a look at them. When they opened the door of the hangar, I stood face-to-face with 700 emergency transmitters. I was dumbfounded and bought them on the spot for 70,000 DKK. The price included the kites and balloons that were designed to hold up the antennas.

To blow up the balloons there was gas in tins for which we had no use, so they were put into storage until an expert informed us that it was quite the wrong thing to do. Tins of lithium hydride were dangerous and required special storage facilities. I managed to find a purchaser in Germany who paid 70,000 DKK for them, so that was a good deal.

The emergency transmitter, which had been given the name Marinetta, was a great sales success and at DISA Elektronik, we gradually developed more

An illustration of the Gibson Girl from an American Air Force instruction book 1942.

communications equipment - especially for coastal telephony - which was sold through International Skibs Radio (ISR). So when DISA decided in 1964 to sell its marine radio division, it was natural for us to contact J. K. Kristensen, Managing Director of ISR. A deal was made.

JKK: DISA Elektronik - represented by Beyer - offered to let ISR take over the maritime production programme and the stock, but the Marinetta was not included in the offer. I was not really interested in going into production, but sales of DISA's products were so important for ISR that I saw no alternative. A good piece of advice, which was to turn out to be a blessing, made me insist that the Marinetta be included in the deal. After lengthy negotiations the price was settled at 200,000 DKK.

I got the approval of the Board and it was decided that production, design and sales should be in the hands of an independent share company. This was founded with a share capital of 200,000 DKK, which was supplied by ISR.

At the time, this was a very risky endeavour for ISR, not least because our main shareholder indicated very clearly that the risk was ISR's alone.

The share capital was just enough to pay off DISA. There is a certain satisfaction for a buyer to know that the company which, the day after its start, did not have one single penny in working capital and which has not since raised capital from shareholders, has an equity capital of over 25 million DKK, 25 years later.

ISR and SAIT were the largest single customers for DISA's maritime products but there were other important customers too. Especially for the Marinetta. We feared that for reasons of competition, their interest might diminish if it became known that ISR was the sole shareholder in the new company. Not so much because of ISR, but more because it was well known that SAIT owned ISR.

It was therefore agreed between buyer and seller that details of ownership should remain secret and this secrecy lasted for the next 11 years. From 1965 to 1976, therefore, I was a nominee director, although in practice, as Managing Director of the sole owners, ISR, I acted as chairman of the Board of the new company.

The search for a Managing Director

As early as in 1965 I tried to persuade DISA Elektronik's Sales Manager, Carl Sørensen, to be Managing Director of the new company, which had been given the name SKANTI.

We had moved into new premises at the address 32 Kirke Værløsevej, where we remained until 1967. It was SKANTI's first Managing Director, Anker Bølling, who invented the name Skandinavisk Teleindustri, abbreviated to SKANTI. The main source of income was the Marinetta, later developed into the TRP 1 and sold in more than 20,000 units.

I was convinced that Carl Sørensen would be a good man for SKANTI. While ISR sold DISA's maritime products, we were in sharp competition with well-established suppliers to the market. These competitors were quite conservative in their marketing, while ISR followed a more progressive line. In this work, I enjoyed the fantastic

The transmitter valves in a TRP 400. On the metal strip at the bottom of the picture are some of the later-generation components: left, the ceramic transmitter valve used in the TRP 5000; centre, the transistor used in the Marinetta TRP 1; right, the transistor used in the TRP 8000 in 1983.

support of Carl Sørensen, whose diligence, skill and industrial experience were, in my opinion, just what SKANTI needed to survive.

In 1968 I finally got Carl Sørensen's consent and it was he, more than anyone, who created the SKANTI we know today.

Thanks to Marinetta

The important goal for SKANTI was to develop a short-wave SSB set that could be on the market in 1972, when, according to a new regulation, new ships under 1600 G.R.T. might no longer be fitted with Double Side Band (DSB) equipment. The development of this product - later world-famous as the SKANTI TRP 400 - cost 5 million DKK and the money was to come from the sale of the products we had taken over from DISA Elektronik.

Thanks to new regulations, ships down to 500 G.R.T. were to have lifeboat transmitters and in Norway, ships over 1600 G.R.T. even had to have two. We had the Marinetta and could still purchase Gibson Girls from surplus stores. In spite of increasing prices for them, the Marinetta came to be our salvation. Not only for the development of the TRP 400 but for the whole of SKANTI.

The development work was very ably led by Søren Trier, who entered the firm in 1968, but sadly died about ten years later.

Firms such as Marconi in England, Telefunken in West Germany, CSF in France and Furuno in Japan were announced as the suppliers of the new product.

Only a narrow circle were aware of SKANTI's plans and this development project. It was a real achievement for SKANTI to snatch the victory from these powerful, international competitors, who, by the way, hastily withdrew from the SSB market.

The end of adversity

The time of adversity was now over and there was money to invest in the development programme required by the prescribed switch from DSB to SSB.

The success of the TRP 400 continued with the TRP 5000 in 1978 and in 1980 SKANTI presented the very advanced coastal telephony equipment TRP 6000. In the meantime we had developed a coastal telephony set, which was the only SKANTI product not to have enjoyed success.

The Marinetta as well as the new products appealed to the same circle of customers as did DISA Elektronik and increasingly customers began to show an interest in who owned SKANTI. In 1976 it was decided that the time was ripe to expose the well-kept secret.

From Managing Director to Board Chairman

In 1980 Carl Sørensen wished to retire but agreed to continue as working Chairman of the Board for another year. It turned out later that he was a difficult man to replace and in 1982, I had to function temporarily as Managing Director of SKANTI.

P. C. Beyer, whose experience both Carl Sørensen and I wished to benefit from, had joined the Board in 1974 and, in my time as Managing Director of SKANTI, became Chairman of the Board and thus an active adviser in the next huge development project.

Huge investment in the future

All ships with telephony equipment had now got SSB, and our TRP 5000 was due to be replaced. We aimed high with a product programme that could replace the TRP 5000 and be the main transmitter and main receiver for telephony and telegraphy. In addition, we wished to cover a frequency range which would make the equipment suitable for point-to-point communication as well. We also intended that the new set should have a knob-free control panel, operated exclusively by finger touch controls - something that made the equipment sensational at that time.

The result - the TRP 8000 series - is well-known, as is its success. The development costs had been the highest ever: more than 30 million DKK.

When this success had been achieved, P. C. Beyer withdrew from the Board in June 1985 and six months later I retired too. Some years earlier, I had got Peter Vange of Sterling Airways to be a member of the Board of SKANTI and on 1 April 1986, he became Managing Director of SKANTI A/S. One year later he also became a member of the Board and Managing Director of NAV-STAR A/S.

In that way a link was forged between the future, the present and the past of a firm which, the day after its foundation, didn't own a penny, but is now the leading trendsetter on the market.

Ideas become useful realities

"Three things move the world:

- ideas,
- plus making them work,
- plus making people like them." (R. P. Crawford)

SKANTI's R & D department has the people, the ideas and the technology. How do we turn all this into successful products?

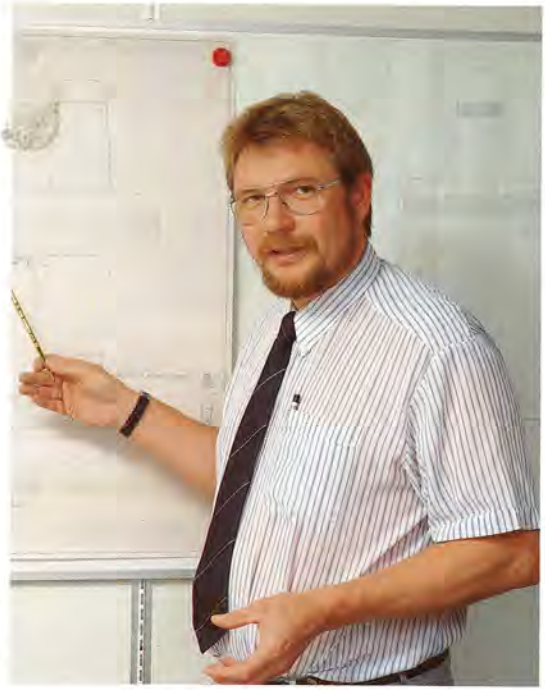
For 25 years, SKANTI has been a trendsetter. Every new regulation or demand has been met with a product that not only lived up to the new situation but, at the same time, gave the customer some long-term possibilities for the future.

But some of SKANTI's greatest successes have not resulted from official requirements. They have been inspired by the close contact between the R & D department, the customer on the coast, the highly-developed network of distributors and SKANTI's sales department.

One of the explanations for 25 years' success is to be found behind the code-locked doors in the R & D department in Værløse, Denmark. This is the workplace for more than 30 experts who are preparing SKANTI's future.

SKANTI has invested large sums in its R & D department. Not just in single, pioneering development projects, but in the form of regular investments in the department's facilities. Our engineers always have state-of-the-art design tools at their disposal. Our laboratories contain the latest technology for design, testing and measuring, so that the R & D department has the physical surroundings that make it possible to turn ideas into useful realities.

How do new ideas arise? What happens in the course of the three to four years that often lie between idea and finished product? And how has SKANTI succeeded in creating an R & D environment that can attract the very best people and hold them for years?



Johannes Christensen, R & D Manager at SKANTI.

In this 25th anniversary interview, R & D manager Johannes Christensen answers these questions and reveals that the human element is highly rated in the daily interplay of high tech and hard sweat.

The ideas

"There are ideas that come in a flash of intuition while one is in the bath or out sailing on a day off. But these are rare. Most ideas come about as a result of systematic and close contact with the outside world," says Johannes Christensen.

"Often, it is changes in external circumstances, such as new official rules and regulations, which provide the starting point and present us with the task of developing a new technology which will satisfy the new demands at the right time."

"But some of the most useful ideas occur as the result of close contact with distributors and users. Members of the R & D department often participate in conferences, technical courses and meetings with customers in various parts of the world. Here we get an indication of what customers will be wanting in the future and we get feed back on how they utilize the already existing equipment."

"To remain attractive, we must always be at least as good as our competitors. Through exhibitions, data sheets and such sources we keep ourselves well informed on our competitors' products and it sometimes happens that they provide us with inspiration. There is no need to invent the wheel for a second time. We just have to be sure that every one of our products contains something that has not yet struck our competitors."

"All R & D personnel follow technological developments in the literature and trade journals. It has often happened that a new technological improvement has given them the inspiration for a solution. When this happens, we get hold of the employees who are closest to the users. Before going any further, we want to know whether the idea can be used. It is not sufficient that we in the R & D department think it might be fun to create something new."

An important element in the creation of new ideas is the patent search. When SKANTI has arrived at a new solution, it is necessary to find out whether it has already been patented. In the search process,

The SKANTI antenna tuner is tested under realistic conditions. Here on the roof of the main building in Værløse.

contacts are made with new knowledge and new ideas.

On rare occasions, the solution to a problem can be so simple that it is difficult to believe in it. Johannes Christensen has a good example of this from when he was a new young SKANTI engineer working on the development of the antenna tuner principle for the TRP 6000.

"There wasn't much literature on the subject, so I was completely at sea. I sketched some possible solutions on a piece of paper and suddenly I saw a design that suggested the solution to the problem of the control system. But it looked much too easy. I consulted some more experienced colleagues and they thought the same: it looked correct, but it was almost too simple. There was only one thing to do: we built it. And it worked! One is rarely as lucky as that. Usually, the generation of new ideas is a question of hard, systematic work, where you have to keep up with technological developments all the time. Because only in that way, can you decide whether an idea can become a reality or is merely interesting."

Pilot study

"Every large project has a pilot study phase, where the main lines of the project are laid down.

Not just technically, but also from the point of view of production, investment and sales. It may be difficult at so early a stage to work out the cost price of a product which won't be on the market for another two to three years. But this is also part of the work of the R & D department. When, in its day, we calculated costs on the TRP 7000, it turned out, on completion of the first set, to be correct to within less than 5%."

Johannes Christensen compares the exciting pilot project phase with a marriage. From the first passionate infatuation to a smoothly running everyday life, broken occasionally by sharp differences of opinion that serve to clear the air.

The development of a project's mechanical and electronic sides start simultaneously and, from the first day, the various elements of the project are placed within a framework. The appearance of the product is fairly well settled, together with the dimensions and costs and the group, often of 15 engineers, each with his task, must keep within the framework decided upon.

"There can be friction when 15 highly qualified individuals are working together on a project for three years. They have to keep within the overall framework and, even though each of them may have solved his own problem perfectly, it can turn out in the end that there is something that must be altered. It is no good beginning to blame each other. Instead we have to cooperate on defining the problem and solving it in a way that will benefit the product."

"That is why at SKANTI we place great emphasis on the personality of the individual. The person concerned has to fit into a team. Of course we must have staff who are technically competent but the human aspect and the ability to cooperate are worth at least as much."

The laboratory model

When the pilot study phase has been completed and the provisional design has been finalized, the first laboratory model, known as LAB 1, is built. The technical unity of the project is tested with this model. The specifications of the project are still incomplete. The participating engineers have provided their solutions, coordinated by the project manager.

"However, there can still be things that do not quite work as we wanted them to, so the individualists have to meet again in order to discuss the whole." As Johannes Christensen says, "Decisive for success is our ability to govern creativity. Otherwise everything stops."

An R & D department cannot be managed on the hierarchical system. No product would ever come out of it. The project manager has to make use of each individual employee's strong side, see that they work as a team, break down barriers - but still be aware of them and, if necessary, set them up again.

When LAB 1 is finished, the mistakes - and there are usually some - are put right. Then comes LAB 2, where the mechanical parts are tested too. By this time, the project has developed into a functioning piece of equipment that exemplifies the ideas behind it, lives up to expectations and works.

The prototype

The production department, the purchasing department, the finance department and the marketing department have all participated in the development process. A steering committee ensures the final coordination and at the same time, subgroups have been set up across departmental boundaries. For example, a testing group, a mechanical group and a components group.

When the LAB 2 model is finished, the production department will build a prototype. The R & D department still has responsibility for the product, but it is the production department that will build five to ten prototypes, so complete that they can be used for the obtaining of a type approval.

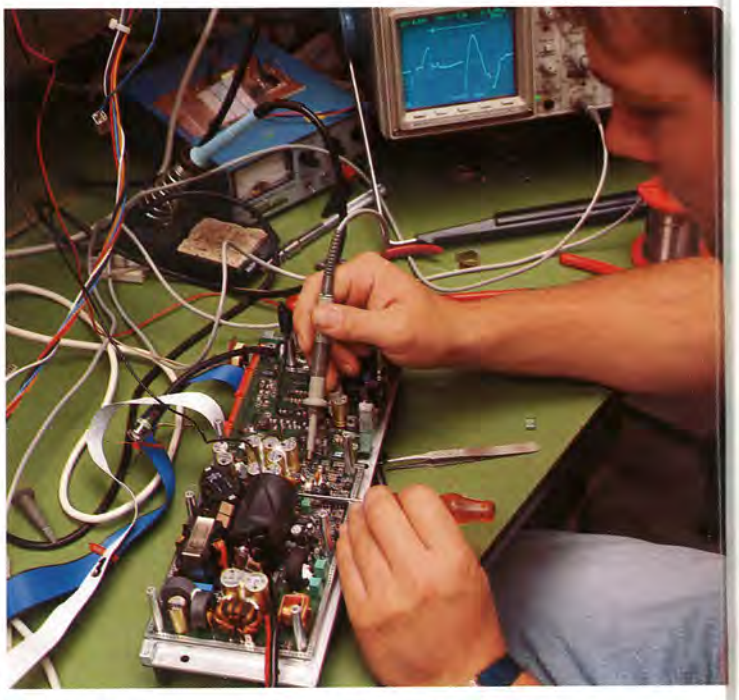
"In the R & D department we feel that we have good relations with the production department. That's not how it is everywhere. We can, of course, have a disagreement and raise our voices with each other, but we understand each other's problems. This is one of the strengths of SKANTI and an important reason for the fantastically good results we achieve."

The completed prototypes undergo a very time-consuming testing with measuring instruments. This has to take into account the various requirements of the countries in which the equipment is to be sold.

Preliminary production series

Depending on the size and design of the set, 20-30 specimens will be produced in a preliminary production series.

Ideas are tested in the laboratory as the development project takes shape.



"In this phase, the production department and R & D have to consult a great deal with each other. In order to rationalize, the production personnel want the series to be as large as possible but we don't allow them to purchase too much material before we have seen the results of the preliminary production series. Quality is our top priority and we examine every single set in the preliminary series to uncover any possible faults."

Before the preliminary series goes into production, a process of configuration is carried out so that the equipment will satisfy special customer demands or the requirements of the authorities in the country concerned.

An attractive environment

From the outside, it may be difficult to imagine the work that is done in SKANTI's large R & D department. Some people think of grizzled scientists sitting behind locked doors and scribbling long equations on graph paper, which is then sent to technicians for the routine work to be carried out.

That's not how it is at all. Certainly you would need to know the code in order to gain admission to the department but, once inside, you would experience an environment of openness. Work is carried out on a cooperative basis. Side by side with the major projects, smaller ones are in process and the various engineers follow their own projects throughout. Right from the first sketches to the physical process of producing the specific part which is theirs.

Johannes Christensen estimates that the creative part of the work takes up 25% of the time, the rest is routine. And a constant eye must be kept on finances.

"In Denmark we are handicapped by not being able to collect all components at a local factory gate. We have to go out onto the international market to find them and this is costly. Therefore every single print board is looked at from all angles. Can it be carried out more cheaply without affecting the quality and without it taking up more space than the pilot study allowed for? This is in itself a challenge to our creativity."

SKANTI is an attractive place for a design engineer to work. This is due to the continued investment of large sums of money in new projects and

Bent Bendixen (left) celebrates his 25th anniversary at the same time as the company and his colleague, Kaj Kvistgaard, has been there for 24 years.

because, as a trendsetter in the communciations market, SKANTI has ambitions.

"But it takes many things to make a firm an attractive place to work in. We have to be able to combine creativity with routine, technology with human contact and cooperation, freedom with the necessary degree of control. I think we have succeeded very well," says Johannes Christensen. "We attract the highly qualified employees we need and they stay with us for a long time. Together with the satisfaction shown by our customers, this is probably the best proof that together, our employees have created a good place in which to work."

The R & D laboratory has advanced technical equipment for design and measurement.

The type approval world is a jungle

A new product has to be approved in every country where it is to be sold.

The rules vary a great deal, but a common solution for Europe is on the way.

After 1992, approved, private laboratories will be able to issue type approvals in accordance with the new ETSI standard.

On the oceans of the world, ships which are registered in various countries such as Holland, Australia and USA can communicate with each other without difficulty. But their communication equipment has been type approved under three different sets of rules, and the HF radio telephony equipment in one ship would not be approved for one of the two others without alteration. Everybody agrees that there must be perfect communication between the different sets of equipment and that they must not interfere with other services, such as the distress service. But agreement goes no further than this.

Every piece of maritime communications equipment must be type approved in the country of the ship's registration. Even though the International Maritime Organization adopted the International Convention for the Safety of Life at Sea in 1974, there is still a host of national rules that make the type approval world something of a jungle.

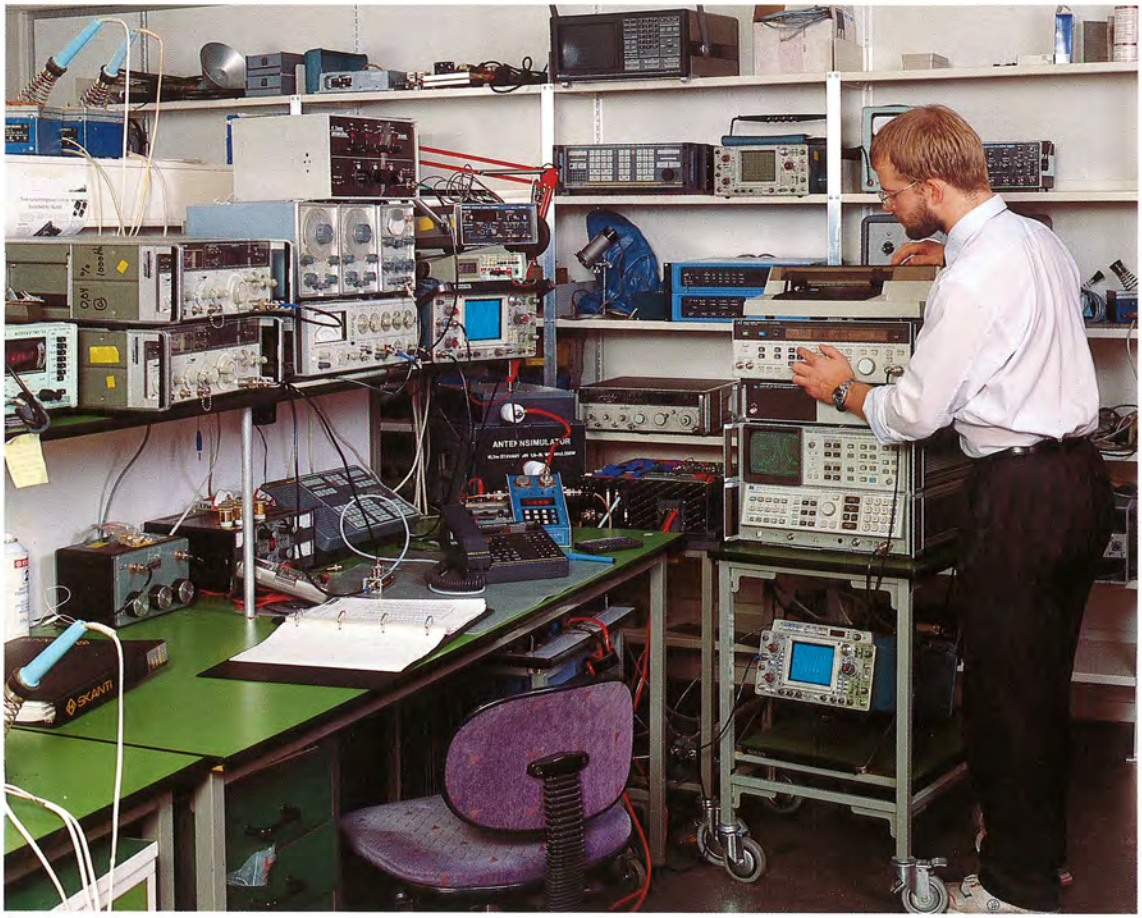
CEPT (Conférence Européenne des Administrations des Postes et des Télécommunications), together with representatives from all member countries, has set common requirements for type approvals but each country has its own interpretation of the regulations. Germany and Holland, for example, set higher standards for protection against electromagnetic radiation.

USA has its FCC rules, which are regarded as almost impenetrable by foreigners. Whereas all the rules for radio communication equipment are, in most countries, collected in one volume, in USA they are spread over three volumes in between FCC rules for microwave ovens, washing machines and other electrical equipment. At the same time, the rules for radio telephony equip-

ment differ on important points from the CEPT standards.

Australia and New Zealand have their own rules, which resemble both those of CEPT and those of FCC but which make special demands regarding speech characteristics and therefore to compressor design.

And yet ships from the three type approval areas communicate without difficulty when they meet on the world's oceans.



All new SKANTI products are put through a long measuring process before being sent to type approval.

New common rules

Every single SKANTI product has been type approved in the countries where it is sold and engineers in the R & D department allow for the widely differing rules when creating a new product. It must be arranged that as few configurations as possible are to be carried out when new products are to be sent out onto the world market. Thus, the TRP 8000 has been approved not only in Europe but also in USA, China, the Soviet Union and other parts of the world.

Work is at present going on with a view to the shaping of a common European set of regulations for type approvals. In 1992 the former CEPT rules will be converted into the common ETSI standard. The responsible institution in each member country has sent the proposal out for consideration by the firms concerned. In Denmark the Danish Standards Association has asked SKANTI, among others, for comments.

The ETSI standard will come to apply to all EC countries and there are reasons for supposing that other countries will also follow it.

It will thus be simpler in the future to achieve type approval. On the other hand, a European market with one set of standards will be more attractive for manufacturers previously unknown here.

Approved laboratories

The ETSI standard will also make it possible for other laboratories than the public ones to approve new communications equipment.

Such laboratories will have to undergo a thorough approval procedure in accordance with common standards and the measuring methods laid down. Even though it will be expensive to achieve such an approval, there are many private laboratories interested in having it.

This will mean that in future, by obtaining a type approval from a private laboratory in, say, Germany, SKANTI will receive a certificate that is valid in the other countries.

Until now, the type approval process has been long and drawn out and has felt even longer in the case of a development project which may have been under way for four years. In future it will go much more quickly, because the new laboratories will be in international competition on both prices and deadlines.

The custom at SKANTI has been for the R & D department to carry out an often month-long control measurement of prototypes for the various markets. The internal measurement report has then been sent to the type approval institution in each individual country.

"There is no requirement for us to send the internal measurement report, but it has turned out be an advantage to do so. The authorities can see that we have done extensive preparatory work. That - and a 25-year tradition at SKANTI of living by producing quality - has earned us goodwill," says R & D manager, Johannes Christensen. "We are never satisfied before a new product has been measured against the strictest standards."

The world's best network of distributors contributes to success

SKANTI has sole distributors in 50 countries and since 1965 has sold over 70,000 units.

94% of our production is for the export market. The coming of the new, single European market and the introduction of GMDSS in 1992 will present new challenges.

Until the year 2000, an increasing number of new merchant ships will be built and the extensive market for pleasure craft will be interested in SKANTI products.

Since 1965, SKANTI has supplied over 70,000 units to shipping lines, fishermen and other commercial vessels, pleasure craft, and the point-to-point market represented by the military, paramilitary, foreign services, police, telephone/telegraph authorities and coast stations.

Today, 94% of the total production goes to the export market. Great demands are made on the international sales organization and SKANTI is represented by sole distributors in 50 countries.

"SKANTI has a well-defined sales policy which gives the individual distributor both responsibility and initiative. It is a matter of integrated cooperation with a high degree of loyalty from both sides and I am not exaggerating when I say that SKANTI has the world's best network of distributors," says Johan Hansen, Director of Sales. "The success which we experience after 25 years is shared with our partners throughout the world. In terms of number of employees, SKANTI is a small firm and as such, highly dependent on a successfully functioning chain of distributors on the world market."

Close contact

The majority of sales on the maritime market go through national distributors, most of whom have a network of dealers keeping in close contact with the end-customers - shipping lines and boat owners. In certain cases, however, SKANTI has direct contact with the end-customer, typically in the case of large projects demanding extraordinary technical back-up and an overall solution.

On the point-to-point market, there is an open market policy, by which SKANTI participates as

Johan Hansen, Director of Sales, supervises SKANTI sales world-wide.

a sub-supplier through a system house or has direct contact with the customer.

"We have close contact with our distributors around the world and our sales department at home has many international conversations daily," says Johan Hansen. "It is my impression that many distributors find it attractive to cooperate with a firm of SKANTI's size and profile. They are able to offer exclusive products, they have responsibility for carrying out the marketing in their areas and they usually think that we are easy to communicate with. We are not especially formal at SKANTI and our distributors and their employees soon achieve a direct contact at all levels so that they can obtain immediate answers to their questions."

The challenge of 1992

1992 will be a remarkable year for SKANTI and our colleagues on the communications market. A large part of western Europe will become one single, unified market with common type approval standards and procedures, whilst IMO's Global Maritime Distress and Safety System (GMDSS) will be introduced.

These two things together will mean increased competition and a demand for new products. At SKANTI we have prepared ourselves thoroughly for both challenges. Our TRP 8000 series will, for example, be supplemented by a GMDSS package, whilst completely new products will be produced for satellite communications, among other things.

The TRP 7000 and other SKANTI products are displayed at exhibitions where members of the trade meet.

Distributors and their employees participate in courses at SKANTI in Værløse in order to be able to offer customers the best possible service.

The maritime communications market has previously been considered by many large, international companies as an area requiring large investments and much work. SKANTI has a different view of it. We have specialized, have become trendsetters, we know the market and have an incredibly well-functioning network of distributors. These are strengths that will give SKANTI a solid position on the increasingly competitive market that will come after 1992.

In the new situation, distributors will come to play a more prominent role. Together with us, they will have to defend the position achieved on the national market and they must also have their eyes and ears open for new possibilities. On the other hand, there is nothing in the future that will make us change the present, clearly defined sales model. It is effective, market-relevant, flexible and marked by enthusiasm. This benefits all: customers, distributors and SKANTI.

Brighter prospects

In spite of a recession on the shipbuilding market, SKANTI has continued to make progress. This has been done by developing a series of products so attractive for the user that SKANTI has been able to obtain many orders even from this declining market.

There are signs that things are beginning to change and that the future holds brighter prospects.

AWES - the Association of West European Shipbuilders - predicts a considerable growth in shipbuilding until the year 2000. The assumption is that 10% of the growth will be due to a need for increased cargo capacity and 90% to the replacing of existing vessels.

There was an increase in new constructions already from the end of 1989 and the electronic in-

dustry for communication and navigation equipment expects an annual growth of 10% in the next few years.

Reduced fishing quotas have affected the northern European fishing fleets, which have always been large purchasers of SKANTI products. But what has been lost on the fisheries market in Denmark, Norway and Britain has been partly compensated for by increased activity in Spain, Portugal and Italy.

Within the last decade, SKANTI has increasingly made its mark as supplier to the pleasure craft market. First in Denmark, Norway, Britain, West Germany and Holland, but now gradually, in USA too.

It is products such as the SKANTI TRP 8000, VHF 3000 and TRP 7000 which have made SKANTI an attractive supplier to the often very critical and extremely price-conscious, professional yachtsmen.

When the world's longest sailing race, "Whitbread around the World Race" was last held in 1989, 15 of the 23 boats which started were equipped with SKANTI HF radio telephone sets.

SKANTI is working all the time with 40-60 projects for the point-to-point market. These sales represent a niche in the total turnover, but it is a market with great potential.

Many of our tasks lie outside Europe, for example in connection with an aid project in Africa and at the end of the 1980s, SKANTI was a supplier to two very large European, land-based projects.

A meeting of distributors held on board an old sailing ship in Copenhagen in 1986.

"We face the coming years with anticipation, but also with the certainty that SKANTI will be able to continue to make progress, both in terms of production and in terms of the market, on the more competitive, single European market that will be created in 1992," says Johan Hansen.

1965

1965 was the year when Skandinavisk Teleindustri, SKANTI, was founded but there were many other events which stick in the memory.

The synchronous telecommunications satellite Early Bird was launched with its capacity of 240 telephone channels and one TV channel.

Winston Churchill and Albert Schweitzer died in 1965.

The International Telecommunications Union celebrated its first centenary.

The Soviet cosmonaut Leonov was the first man to leave a space ship in space. He spent ten minutes out in space close to spaceship Voshkod II.

The semi-conductor component Varactor reached the highest frequency limit of 8 GHz. The unit is used for microwave transmission.

Cassius Clay became world heavyweight boxing champion and Chairman Mao of China swam in the Yangtze River.

DEC in Boston launched the PDP 8 minicomputer which represented a technological turning point.

SKANTI Marinetta

In 1965 SKANTI had only one model in production: the SKANTI MARINETTA Survival Radio. This portable transmitter-receiver satisfied all the current SOLAS regulations and was required in ships over 1600 G.R.T.

The Marinetta being packed in a yellow, glass fibre container in 1965.

The MARINETTA transmitted on 500, 2182 and 8364 kHz and was equipped with a hand operated generator. The standard of mechanical strength required by the regulations was very high. Sealed inside its glass fibre container, the Marinetta had to be able to withstand a fall from 20 metres and it had to be able to function in a lifeboat under the most difficult weather conditions.

The MARINETTA was fitted with both a whip antenna and a wire antenna. To keep the wire antenna in the air, there was a kite.

1968

Holography was being developed in Britain and the USA and the first laser powered by solar energy was demonstrated in the USA.

The world's largest tanker to date, the Universal Ireland, set out on its maiden voyage. It was 330 metres long and had a tonnage of 312,000.

Large Scale Integration (LSI) was developed in several different places in the world. LSI consists of chips containing many thousands of logic gates.

On 6 February 1968, colour television on the PAL system was broadcast for the first time in Denmark.

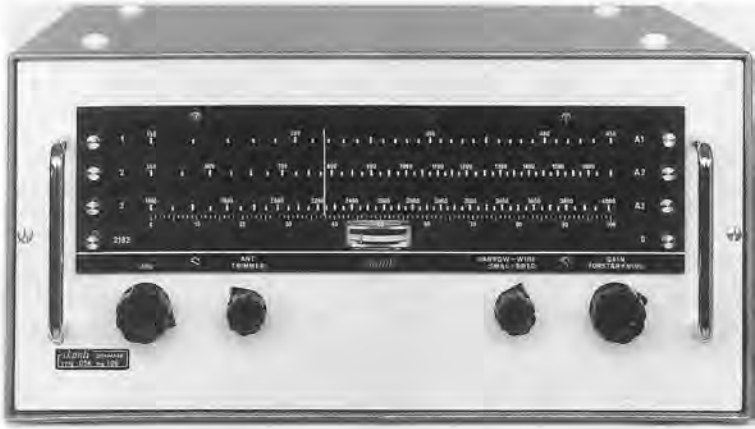
Texas Instruments launched the first pocket calculator, SR (slide rule), which replaced the traditional slide rule in SKANTI's R & D department.

SKANTI E 15 and D 55

SKANTI sent its first self-developed products onto the market. They were the E 15, a 50W telephony transmitter, and the D 55 telephony receiver. Both products designed primarily for fishing vessels.

American and European semi-conductors were used but the output stage of the transmitter still made use of radio valves.

The D56 receiver was the first to be designed by SKANTI itself.



The SKANTI E 15 was designed for ship-to-ship and ship-to-shore telephony communication on the 1605-3800 kHz band. It had 24 crystal-controlled operating frequencies within this wave range, distributed on eight channels with three frequencies on each. The transmitter weighed 10 kg.

The SKANTI D 55 was designed for duplex telephony and operated on the 1605-3800 kHz coastal telephony band. In addition to a direction-finding receiver in the 170 to 4000 kHz frequency range, the D 55 had a watch-keeping receiver on the distress frequency of 2182 kHz.

1971

By means of a parachute, the unmanned Soviet space ship Mars 3 landed an instrument box on Mars. Pictures and signals were transmitted from Mars to Earth for the first time.

Chancellor Willy Brandt received the Nobel Peace Prize and on 26 October, the U.N. General Assembly admitted the People's Republic of China to membership.

Lyngby Radio in Denmark opened the first public teleprinter service for ships.

Intel launched the first microprocessor, the 4004, with a four-bit capacity.

The first manned vehicle was landed on the Moon by the space ship Apollo. In three trips it covered 65 km.

The SKANTI TRP 400

The International Telecommunications Union (ITU), decided that, after 1 January 1972, only radio telephony with Single Side Band (SSB) might be installed in newly built ships. SKANTI, therefore, designed the TRP 400 marine radio telephone with 400W MF/HF SSB.

This was SKANTI's first SSB set and it soon became a best-seller. In the following years over 2,000 TRP 400s were produced and SKANTI achieved about 70% of the world market.

The TRP 400 was a complete station with receiver and transmitter and provided 68 transmitting channels and 78 receiving channels in the 1.6 - 4 MHz, 4, 6, 8, 12, 22 and 25 MHz bands.

Transmitter, receiver and power supply were combined in one cabinet and consisted of easy-to-service modules, such that the printed circuit boards were easily replaced.

The TRP 400 in function at sea.

1973

The first, major international oil crisis set its mark on everyday life throughout the world. Several countries, including Denmark, introduced car-free Sundays in order to save fuel.

On 14 May USA launched its first space laboratory in orbit around the Earth, Skylab 1. Eleven days later a crew was placed on board.

One of the longest eclipses of the sun was observed by world scientists, particularly in Africa. It lasted 7 minutes and 4 seconds.

Pablo Picasso, the painter died.

SKANTI MARINETTA TRP 1

With its MARINETTA survival radio, SKANTI had been the leader in this area since 1965. But new, technical possibilities had arisen and in 1973 a new model, the TRP 1 was put onto the market.

Among the technological novelties, there was an electronic automatic keying device, and integrated circuits made it possible to reduce size and weight without affecting efficiency.

The automatic keying device was given automatic reset and the TRP 1 was fitted with an a.c. generator to provide an even greater degree of dependability.

The Marinetta TRP 1 was presented in 1973 as a further development of SKANTI's first product, the Marinetta.

The TRP 1 was SKANTI's first product with switch mode power supply.

The TRP 1 was just as much in demand as the first MARINETTA, and since 1973 more than 20,000 of them have been manufactured.

1974

The first civil, European telecommunications satellite, Symphonie, was launched from Cape Kennedy. The satellite was a result of Franco-German technical cooperation.

The EEC Commission proposed that a four-week holiday should be compulsory for all.

West Germany won the football world championship with a 2-1 victory over Holland.

US President Richard Nixon held a summit meeting with General Secretary Leonid Brezhnev of the Soviet Union in Moscow on 27 July. On 8 August Nixon resigned following the Watergate affair.

The Universal Postal Union celebrated its centenary.

The SKANTI TRP 2000 and TRP 4000

At the start of its tenth year, SKANTI presented two new products aimed primarily at the fishing fleet. The transceivers TRP 4000 and TRP 2000 were SSB coastal telephony sets operating on frequencies up to 4 MHz.

In their development, emphasis had been laid on the desire for a low cost price, ease of installation and ease of operation.

This was the first time SKANTI produced an antenna tuner with a memory. It was manually operated and had to be preset to the required frequencies when being installed.

The ITU regulations, which took effect on 1 January 1972, were provided for in the new products. But success did not materialize and the TRP 2000 and the TRP 4000 were taken out of production.

A TRP 4000 and a VHF 2500 radio telephone being used in the wheel house of a fishing vessel.

1977

The 16 member countries of the EEC and EFTA inaugurated the world's largest free-trade area on 1 July. It had 300 million inhabitants.

Queen Elizabeth II celebrated her silver jubilee.

An American-Soviet research group equipped a joint fleet to investigate the unexplained disappearances of ships and aircraft in the Bermuda triangle.

The world's first manned space shuttle was test flown in California. The shuttle with its two-man crew was mounted on the back of a jumbo jet.

An iceberg as large as the country of Luxembourg broke loose near the South Pole and floated out into the waters south of Africa.

Lightning struck New York's main power station and blacked out the city for 20 hours.

The SKANTI TRP 5000

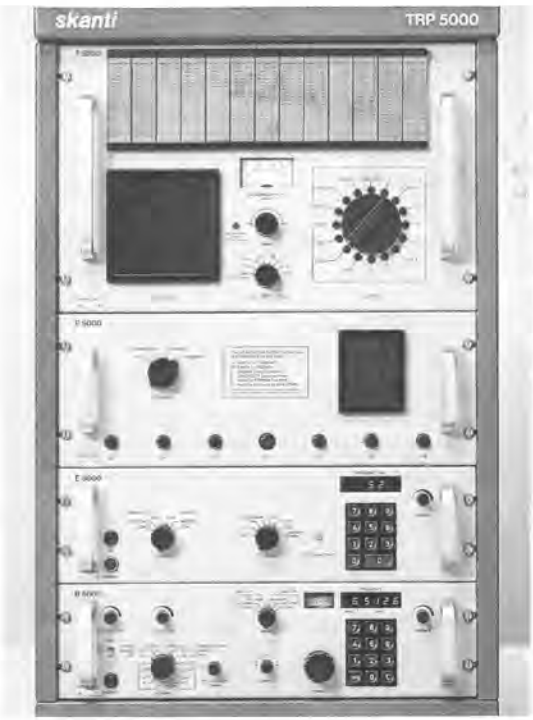
To replace the successful TRP 400, SKANTI presented its second-generation SSB radio communication system, the TRP 5000.

There was another international regulation on the way. From 1 January 1978, AM might no longer be used on the HF band and all sea-going sets were to be gradually replaced.

The TRP 5000 broke with traditional technology in several respects. Frequency selection was by means of a numerical keyboard and a digital LED display for accurate frequency setting. The power supply could be either 24 V battery or 110/115/120 and 220/230/240 V single or two-phase a.c.

The transmitter, receiver and power supply were in a single unit in a 19" rack, which could be installed in a limited amount of space.

With its electronic memory and pre-programmed frequency selection, the TRP 5000 was a success. Almost 4,000 yachts, fishing vessels etc., and a number of point-to-point systems were equipped with the TRP 5000 during the following years.



The TRP 5000, SKANTI's second generation of SSB radio communication systems.

1978

The super tanker Amoco Cadiz ran aground off Normandy and an oil slick covered 100 square metres, the world's greatest pollution catastrophe to date.

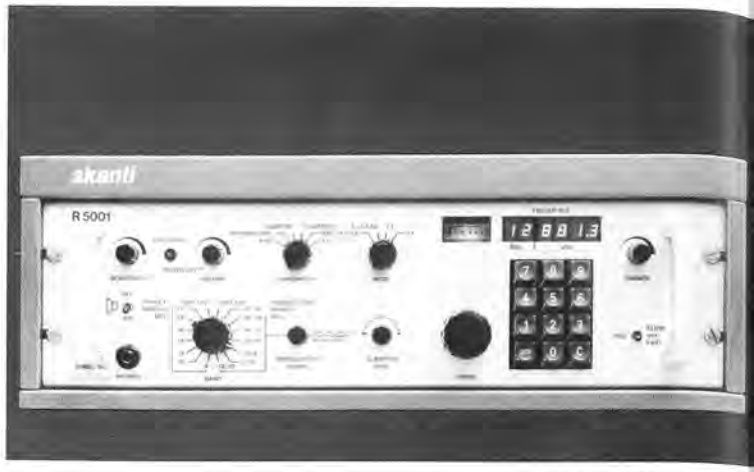
At Camp David, US President Jimmy Carter met Egypt's President Anwar Sadat to discuss the Middle East situation.

Playing at home, Argentina won the football world championship.

A British housewife, Leslie Brown, gave birth to the world's first test-tube baby, a healthy girl weighing 2600 g.

Three American balloonists, Abruzzo, Anderson and Newman, were the first to cross the 4,000-km-wide Atlantic Ocean in a balloon.

China and Japan signed a peace and friendship pact.



The receiver R 5000 was also sold to coastal stations and for point-to-point communication.

The SKANTI R 5000

The SKANTI R 5000 SSB Marine Communication Receiver was developed to be the main receiver in the communication system for ships above 1600 G.R.T. - ships which carried a telegraphist.

The R 5000 was a superhet dual conversion receiver employing true digital frequency synthesis, providing exceptionally high frequency stability over the entire frequency range.

In the F1 mode, the synthesizer is automatically shifted 1500 Hz to accommodate telex over radio communication.

The R 5000 was also sold to coastal stations and point-to-point systems. Production took place both at SKANTI and at SAIT, just as the R 5000 was the first SKANTI product to be produced on license by other manufacturers.

1980

The 22nd summer Olympic Games were held in Moscow.

Japan, with an annual production of more than 10 million cars, surpassed the USA as the world's leading car producer.

Vigdis Finnbogadottir was installed as President of Iceland, thus becoming the world's first popularly elected woman president.

The Ahmed Hamdi tunnel under the Suez Canal was inaugurated to give Africa and Asia a permanent traffic connection.

The rock musician John Lennon was murdered.

The TRP 6000 was the first fully automatic set from SKANTI.

The SKANTI TRP 6000

An international regulation providing for the phasing out of AM in the coastal telephony band was due to become effective from 1 January 1982. The aim was to create room for more channels. SKANTI accepted the challenge and presented the TRP 6000 in 1980. This was an exceptionally advanced set and, during the following years, more than 4,000 of them were installed.

The TRP 6000 was an expression of new thinking and its two-unit design combined a number of technological possibilities. The TRP 6000 was:

- The first fully automatic set
- The first set to incorporate microprocessors
- The first set with a built-in self test
- The first set with an automatic antenna tuner
- The first SKANTI set with a weight-carrying frame of injection moulded plastic

The great success achieved by the TRP 6000 was due to the fact that its design provided completely new possibilities of flexible installation. The units could be placed up to 50 metres apart and, along with the other facilities, this possibility was especially welcome in the small area available in the wheel house of a fishing vessel.

1982

Great Britain and Argentina at war over the Falkland Isles.

After eight years of negotiations, an international agreement is arrived at in the United Nations giving all coastal nations sovereignty within a 12-mile limit.

The first French astronaut, Jean-Loup Chrétien, accompanied two Soviet astronauts in earth orbit on board the space ship Soyuz T-6.

IBM launched the first PC.

SKANTI TRP 2500

In 1982 SKANTI entered the VHF market for the first time. This was with the TRP 2500, a radio telephone designed for fishing vessels as well as yachts. It included all 55 international channels and a choice of up to 20 private channels.

The TRP 2500 confirmed that SKANTI had, as always, an eye for new markets and their needs. At the same time, it demonstrated that SKANTI custom builds its products to meet these needs.

The TRP 2500 was simple in its construction, compact and robust and sold at a competitive price. The radio telephone contained only one print board and, including its mounting bracket, weighed only 2.2 kg.

Dual watch was built in, so the receiver listened in on the international distress channel 16 at the same time as it was functioning on an operator-selected channel. In many cases the TRP 2500 was also delivered with a selcal unit, which automatically registered calls from coastal stations.

The TRP 2500 was SKANTI's first product for the VHF market.

1983

The master of a Danish fishing vessel and member of the European parliament was fined 350,000 DKK in a British court for fishing illegally inside the British 12-mile limit, as a demonstration.

The longest tunnel in the world, between the Japanese islands of Honshu and Hokkaido was inaugurated. It is 54 km long.

The 10 EEC countries adopted a common fisheries policy known as "Blue Europe".

The digital gramophone and its compact discs were presented for the first time. The music is digitalized and moulded into a 12-cm disc of synthetic material.

The 60 Hitler diaries, bought by the West German magazine Stern for 34 million DKK, turned out to be forgeries.

The TRP 8000 series

1983 was a notable year in SKANTI's history. With a development investment of over 30 million DKK, the TRP 8000 series was put onto the market. With its many applications, the series became, more than any other, an example of how SKANTI regards the concept of customer design; not only in the field of maritime communication but also increasingly for the point-to-point market.

The TRP 8000 made use of the latest techniques of digital and microprocessor technology and the three units of the set could be installed, in a truly distributed design, up to 100 metres from each other. The control unit, the transceiver unit and the antenna tuning unit were governed each by its own microprocessor and an internally stabilized supply voltage ensured a stable output.

The SAS Baia Viking participated in the 1985 Whitbread Round the World Race and was equipped with a SKANTI TRP 8250.

The TRP 8000 was the first piece of equipment which could be remote controlled over the telephone network and it was approved as a Maritex station, operated by an ARQ and able to operate un-attended.

To date, more than 8000 of this set have been sold; to owners of large vessels, to foreign services, the military and paramilitary services. From 1983 to 1989, five standard models of the 8000 family were designed. With the many facilities which were built into the first design, it has always been possible, by correct choice of software, to create precisely the equipment which satisfied the individual customer's needs.

The development of the TRP 8000 series started in 1983. The beautiful design is here seen in a TRP 8400.

Here is the SKANTI range of products at the time of the 20th anniversary in 1985. At left back are models from the TRP 8000 series and right, a TRP 5000. In front the yellow box with a Marinetta TRP 1.

At bottom right, a TRP 2500 VHF radio telephone and beside it models from the TRP 6000 series.

This is the first picture showing the change of SKANTI's product colours.

1987

General Secretary Mikhail Gorbachev of the Soviet Union introduced the concept of 'glasnost' in its political sense. The word means publicity/openness.

The British ferry, Herald of Free Enterprise, capsized off the Belgian city of Zeebrugge and 188 died.

The 19-year-old West German, Matthias Rust, landed his light aircraft in Moscow's Red Square after a 900-km flight across Soviet territory.

The Nobel Prize in physics went to the two Swiss scientists Georg Bednors and K. Alex Müller for their research into superconductors.

For the first time since 1604, a supernova, visible to the naked eye, was discovered by astronomers.

The SKANTI R 8000

At the NOR-SHIPPING exhibition in Oslo Norway, in the middle of 1987, SKANTI presented its new main receiver, the R 8000 - a high performance, general purpose LF/MF/HF receiver with a frequency range from 10 kHz to 30 MHz.

The R 8000 was based on many of the ideas which had brought success to the whole TRP 8000 series in previous years. The control unit and receiver could be placed up to 100 metres apart.

Up to 399 complete set-ups could be keyed into the computer memory and the R 8000 could scan 399 pre-programmed frequencies automatically.

The two-unit R 8003 has a separate control unit which is connected by a single multicable to the receiver unit.

The R 8000 was SKANTI's first product with digital notch filter for the elimination of interfering signals, and it was also the first with fully developed remote control, such that it was possible to control a number of receivers centrally, whilst addressing each of them individually at the same time.

The receiver was pre-programmed with all ITU coastal stations and telephony and telex frequencies and operated on upper and lower sideband, AM, CW and MCW morse telegraphy, as well as on FSK radiotelex.

1988

At the Technical University of Denmark and several other places work was being done on the development of superconducting transistors that would make future computers one hundred times faster than before.

Scandinavian Airlines System (SAS) placed orders for 90 new aircraft at a total price of about 15,000 million DKK.

The total world merchant fleet of ships with a tonnage of more than 10,000 stood at about 20,000.

Ten athletes were disqualified for doping at the Seoul Olympic Games. The best known was the Canadian Ben Johnson, who won the gold medal in the 100 metres in a new world record time of 9.74 seconds.

The SKANTI VHF 3000

At the same time as SKANTI's R & D department was working on a new, epoch-making VHF radio telephone, large sums were being invested in the production department on the installation of Surface Mounting Technology. The two things were connected.

In a compact, two-unit design, the VHF 3000 contained a large number of facilities which would have taken up much more space if traditional production technology had been utilized. Now the handset and the transceiver moved into the lightweight class and both were controlled by a microprocessor.

The compact two-unit design of the VHF 3000 was made possible by the use of Surface Mounting Technology.

The VHF 3000 was suitable for several types of boat - including sailing vessels, since, in receive mode, it had a very low current consumption.

The VHF 3000 could have up to 5 handsets connected. It was thus SKANTI's first local network set (EZnet).

Another feature is that it will be possible to connect the VHF 3000 to a personal computer and by this means use remote control through the ordinary telephone system.

1990

It is 25 years since SKANTI was founded.

The world is different today. Walls that were standing a few months ago have gone. New challenges come every day; both for the single nation and for the single human being.

Technology is opening doors on possibilities that we had not even thought of a few years ago. Around the world, work continues on the new superconductors which will make computers operate at one hundred times their present speeds. More and more satellites are in orbit, removing the limits to communication.

Through these 25 years, SKANTI has gained a position as the company which creates products to satisfy the latest expectations and has always done so by means of the latest available technology.

That's how SKANTI intends to continue.

The SKANTI TRP 7000

SKANTI was the first in the world to produce an HF SSB radio system with built-in telex as an integral function that can be operated by means of an ordinary PC and associated printer.

The SKANTI TRP 7000 consists of a control unit, a transceiver unit and an antenna tuning unit. The three units can be placed independently of each other.

The TRP 7000 is the first SKANTI HF set to be produced exclusively by means of Surface Mounting Technology. The result is a set with a maximum of facilities in a minimum of space, and at a really competitive price.

The TRP 7000, the world's first HF SSB radio system with a built-in telex as an integral function.

The 1990 novelty has the fastest antenna tuner on the market at 0.3 - 0.4 seconds, irrespective of whether a wire or a whip antenna is used.

The TRP 7000 has already been installed in many different types of ship, but is also used as mobile equipment with a world-wide range on the point-to-point market.

The new technology is for the benefit of the customer

For 25 years SKANTI has been investing large sums of money in production equipment which utilizes the technological progress of our times.

Top quality and competitive prices constantly call for new technology.

But simultaneously with automation, our skilled personnel have been able to retain their individual identities. They can still do things the machine cannot.

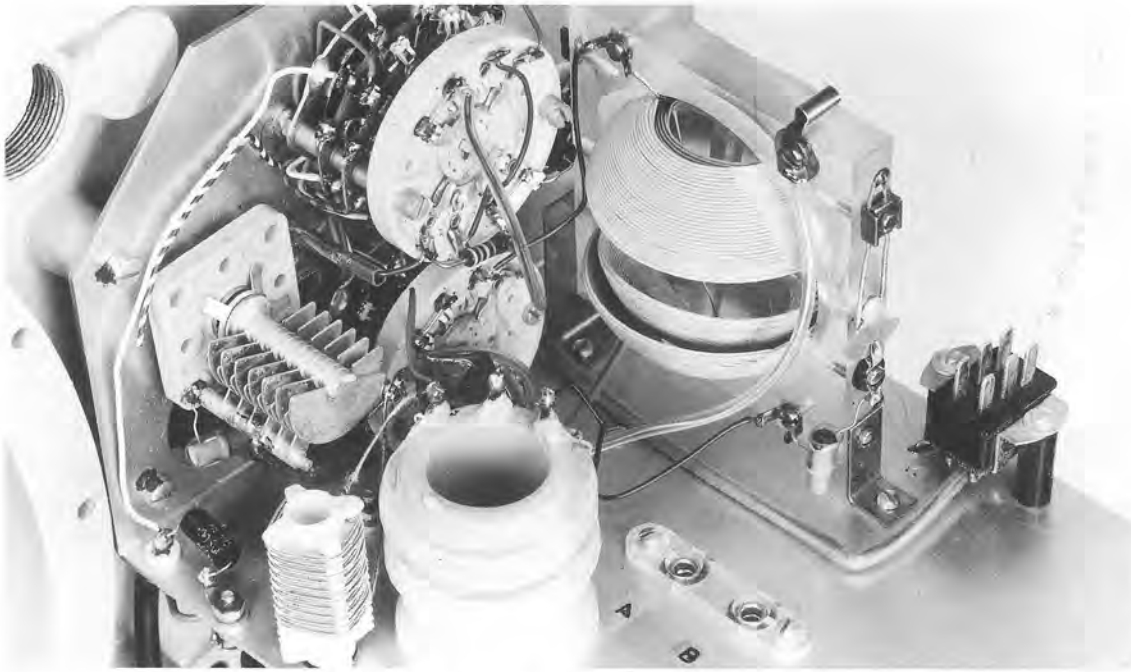
For 25 years every new SKANTI product has represented a technological step forward for the benefit of the customer; and every new product has presented SKANTI's production department with new challenges and has often meant very large investments in production equipment.

The increasing production runs of the popular sets has made it desirable to rationalize and automate production as far as possible. This is with the aim of ensuring a uniform technical quality as well as maintaining a continued ability to meet price competition on the market.

The latest heavy investments at SKANTI's factory in Frederikssund Denmark have brought SKANTI to an advanced technological level, comparable with that of any competitor. But no matter how much automation is introduced, there will always be a need for well trained personnel who retain their identities and various roles in the common cause. Every single one of the large sets of SKANTI equipment has been adapted to the special needs of the customer, and the machine that can do that has not yet been invented.

The great leap forward

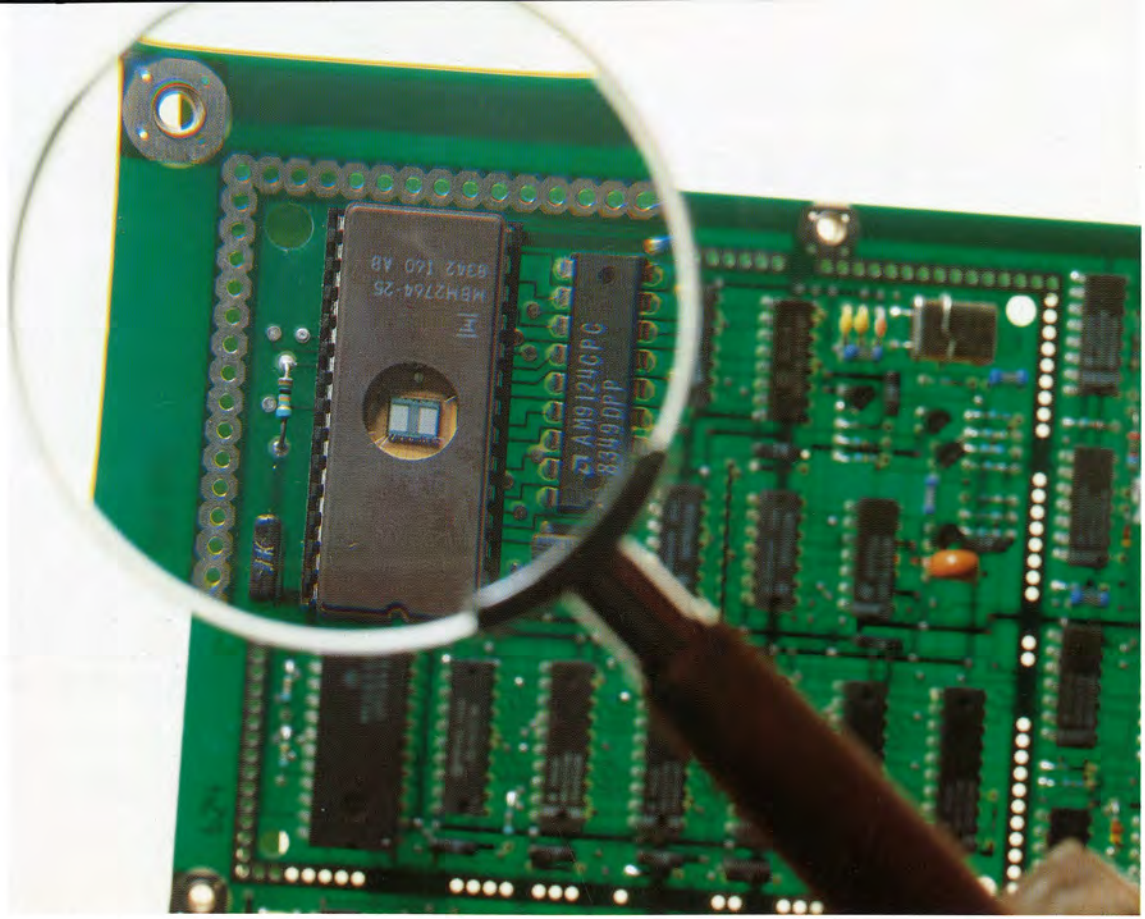
When, in 1968, SKANTI developed its first product, the E15 transmitter, it was the first use of semi-conductors but there were still radio valves in the transmitter's output stage. The handmade terminal strips were connected by bundles of cables. There were knobs and switches to turn and the chassis was made of bent sheet metal. The assembling was carried out by unskilled women fitters and in view of the modest number of sets produced, there was no need for any real materials control.



The insides of one of SKANTI's first transmitters. Below, a look at the production area in 1965.

"In those days, the production of a new line began with the R & D department presenting a finished model and saying, 'Make some of these.' Together we then found out how it could best be done," recalls an employee, who was there from the beginning.

The great leap forward came in 1972 with the TRP 400. This was the first set to be put into mass production; the factory in Frederikssund was inaugurated and took care of module manufacturing whilst the assembling was still done in Værløse.



A PROM on a print board from the TRP 8000 series, seen under magnification.

Factory doubled in size

In 1976 the factory in Frederikssund was extended to double its former size. This was done in order to meet the demand for the, then very advanced, TRP 5000, which was equipped with electronic memory and synthesizers in transmitter and receiver. The individual stages of production were specialized and automatic hand tools, such as pneumatic screwdrivers, were used for the first time.

SKANTI's first fully automatic set - and the first with a microprocessor - went into production in 1980 as model TRP 6000. At that time, module manufacturing in Frederikssund was expanded and a wave soldering machine was installed.

The TRP 8000, which went into production in 1983, was a magnificent sales success and there was soon a shortage of production space. This problem was solved by rationalising and the purchase of a FUJI automatic component insertion machine. Three years later a large computer controlled EPM soldering machine was added.

Important testing

All sets leaving SKANTI have first undergone a thorough testing programme. That is how it has

been for 25 years and it is a principle we shall never abandon.

In step with the increasing sophistication of products and the advanced production methods, it was necessary to invest large sums in testing equipment. The circuits of our products contained increasing numbers of increasingly small components and, in 1982, the SKANTI testing department obtained its first computerized in-circuit tester. This could detect short circuits and measure the electrical value of the individual components. There was automatic print out of detected faults, so that they could be rectified at as early a stage as possible in the production process.

The end of the 1980s saw the installation of computer controlled testing equipment able to test all modules minutely, on the basis of programs prepared in advance. Today SKANTI has two such sets of equipment which ensures maximum operational reliability of testing.

Progress with SMT

The VHF 3000 went into production in 1987. This compact VHF set was based on the application of Surface Mounting Technology (SMT). The turn of the year 1987/88 saw the installation of a Siemens MS-90 Pick & Place Machine, which could assemble 45 different components in one minute with an accuracy of 5/100 mm. At the same time, silk-screen equipment for the application of soldering paste and an IR convection furnace were purchased. The production process was completely reorganized and the employees at the Frederikssund factory were specially trained to operate the new equipment.

Every module is thoroughly inspected before it leaves the factory in Frederikssund.

The experience with SMT, gained during the production of the VHF 3000, was utilized in the design and the subsequent production and testing of the TRP 7000 which was introduced to the market in 1990. A single print board in the VHF 3000 contains 450 components (153 different types). In the TRP 7000 the density of components has been doubled.

When SKANTI was founded in 1965, about 60% of the cost price consisted of materials and about 40% consisted of salaries and wages. Today, materials account for 80-85% of costs. The figures themselves illustrate 25 years of technological progress and SKANTI's ability to make use of it. But the figures also show how important it is that, along with investments in new equipment, attention must be paid to staff training, operational reliability and the choosing of suppliers able to offer a 24-hour service.

For SKANTI is determined to stay ahead!

Norway - a persistent sister with an eye open for new opportunities

SKANTI RADIO, Norway has made great strides since 1972. Not only at home but throughout the world. All Norway's embassies are fitted with SKANTI equipment and the Norwegian company has sent a large number of SKANTI TRP 8000 stations to several African countries such as Mozambique, Gambia, Nigeria, Guinea and Libya.

King Olav of Norway has had SKANTI equipment installed on board his yacht KS NORGE and a large part of the Norwegian fleet and its land stations are also using SKANTI equipment.

There is an exciting story behind SKANTI RADIO. A story of how, in a period when the great Norwegian fishing fleet was in a depression because of the international quota system, it was possible to create completely new markets for SKANTI products.

It is also a story of a persistent Norwegian and his few colleagues who saw and utilized new possibilities. Not only within the Norwegian borders but also in the world outside. Not only within maritime communication but also on the point-to-point market.

Asbjørn Aspevik is head of SKANTI RADIO, Norway and has helped to build the company's success.

The persistent Norwegian is Asbjørn Aspevik, head of SKANTI RADIO since its start in 1972. It is 20 years since he first visited SKANTI in Denmark as a member of the firm which then sold SKANTI products in Norway. Formerly, Asbjørn Aspevik had been a telegrapher in the Norwegian maritime defence service and merchant navy. He supplemented his training with engineering studies and four years of practical work as a designer with the Norwegian defence research institute, later with studies in management and marketing. With this broad knowledge as background he was employed by SKANTI RADIO.

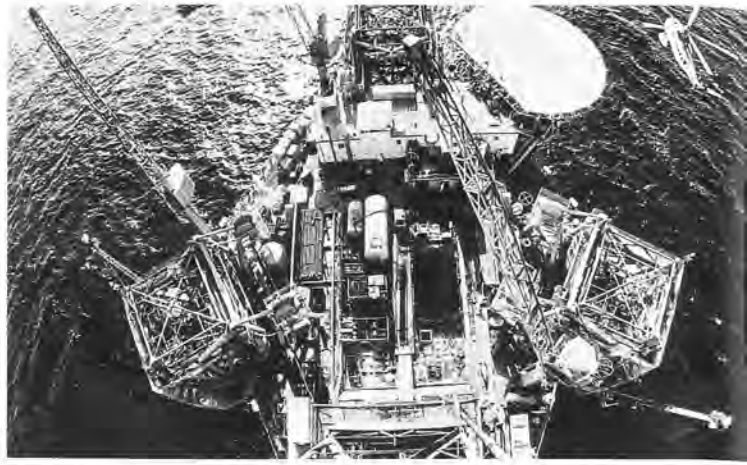
New regulations meant success

"When SKANTI started its own organization in Norway, we had a market share of 4-5%, but in 1973-1974 there was a boom in shipbuilding and at that time 25% of SKANTI's total production was sold in Norway. There was a new international regulation that all large ships built after 1 January 1972 should have Single Side Band (SSB) equipment and SKANTI had designed the TRP 400 to meet this requirement," says Asbjørn Aspevik.

"The orders came pouring in, since in the first years we had no competition in the field of SSB short wave equipment. The first two sets were supplied to the Philips Petroleum Ekkofisk platform in the North Sea."

SKANTI RADIO had been launched with a share capital of 100,000 NOK and SKANTI's Managing Director at the time informed Asbjørn Aspevik that he need not come back if he ran out of money.

Drilling platforms in the North Sea oil fields have helped to create activity in Norway.

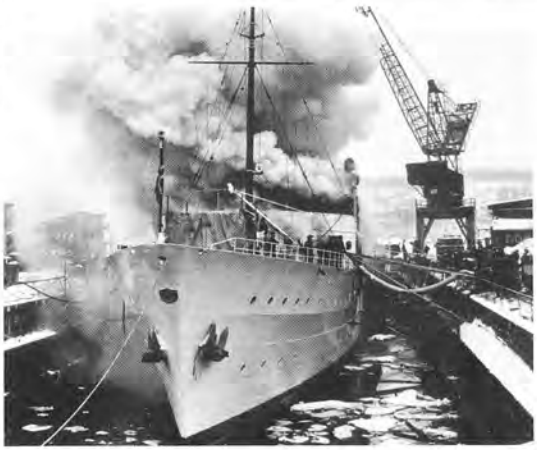


He did not run out of money. A tight little organization was created which, with Oslo as its base, imported SKANTI products, trained dealers and took care of service. Today, the Norwegian company still has only eight employees, whilst fifty dealers on the coast look after sales to the fishing fleet and the extensive Norwegian pleasure craft market.

Contact with the deep sea fleet is maintained by Asbjørn Aspevik and his staff themselves. It is also they who have built up the extensive contacts with the point-to-point market and who look after installation around the world: on board ships, at embassies, in Africa, at shipyards which are building vessels for Norwegian shipowners and on naval vessels.

"All employees take part in almost everything we do," says Asbjørn Aspevik. "They are enthusiastic and think it is fascinating to follow a case right through to the end. Thus they operate as salesmen, technicians, servicing personnel and consultants."

The radio room in the royal yacht was equipped by SKANTI in collaboration with interior designers.



The royal yacht was ravaged by fire in March 1985.

The royal yacht

In March 1985 there was a fierce fire on board King Olav's yacht, KS NORGE. The King wished that, after repairs, everything should be as before. But the Norwegian communication equipment on board could no longer be obtained and, in competition with other firms, SKANTI RADIO won the order.

KS NORGE is equipped with a complete SOLAS radio station based on the SKANTI TRP 8757 D MF/HF radio telephone and a TRP 8252 D MF/HF radio telephone. In addition there is a SKANTI R 5001 as an extra receiver. The order

also included the design of the interior of the radio room - a real masterpiece in solid teak.

Experts from the Norwegian navy had the responsibility of choosing the supplier to the royal yacht and the result was considered so satisfactory that it was the start of a successful collaboration.

Nearly all Norwegian naval vessels are now fitted with SKANTI equipment. Departing from normal practice, the navy has chosen transmitters which have not been specially built to naval specifications. This gives them the advantage that they can make use of SKANTI RADIO's chain of dealers on the coast for the servicing and maintenance of their radio equipment.

New markets

In the good years for Norwegian fishing in the 1970s, SKANTI RADIO was a main supplier to the fishing fleet, both for newly built vessels and in case of replacements resulting from new rules and regulations.

"Now the fishing vessel market is rather quiet. Fishermen say there are fish enough, but the quotas set limits to their catches. With the decline of this market, we began to look out for new possibilities and we found them. Both in the deep sea area and in point-to-point."

"This has meant that we have been able to maintain our turnover, even though a considerable part of our original market disappeared. Fishing will make a come-back in a few years, the quota system will be eased and, with its long coastline, Norway will always need a good fishing fleet."

"The secret, if it is a secret, of our success in Norway is simple: SKANTI has always had attractive products. New products have been placed on the market, whenever new regulations came into force while, at the same time, new series have been developed based on the needs of the market. It is also a great strength that the new sets can be used both for maritime and point-to-point communication. This has been of great advantage to SKANTI RADIO. At the same time we have had a highly qualified and enterprising staff, including not least our technical manager, Kåre Nyborg, who has been with us right from the start. He knows SKANTI products better than anyone and, together with his technicians, has been able to work out specialized solutions for our customers and has also ensured efficient servicing in respect of both old and new equipment," says Asbjørn Aspevik.

The future will need satellites as well as HF

When IMO's Global Maritime Distress and Safety System is introduced in 1992, shipping will enter the satellite communication age in earnest.

SKANTI is developing products for the new system and further developing HF equipment. The future will not only consist of satellites. There will still be a need for advanced HF communication and for SKANTI as the trendsetter.

In the year that SKANTI A/S was founded - 1965 - the international consortium INTELSAT launched its first communications satellite. It was known as "Early Bird" and had a capacity of 240 telephone channels.

Eight years later, INTELSAT IV was in orbit with a capacity corresponding to 9,000 telephone channels. This illustrates how rapidly satellite communication was developing even then. Up through the 1980s an increasing share of communication - especially mobile communication - has been based on satellites. At sea it has been primarily commercial communication between ships and their land-based owners that has made use of this possibility.

The year 1992 will be a decisive year for the satellite era. It will see the introduction of the Global Maritime Distress and Safety System (GMDSS), which has been developed by the International Maritime Organization during the last 24 years.

Satellites will play a central role in this worldwide maritime safety system and SKANTI has prepared itself thoroughly for the new situation. At present, the R & D department is working at high pressure on two new satellite-based products as well as on the adaptation of existing products so that they will meet the requirements of GMDSS.

One of the new products is an Emergency Position Indicating Radio Beacon (EPIRB). This is a small emergency transmitter which, activated automatically or manually, will transmit distress signals including position, time and ship's identity on a frequency of 406 MHz in a pre-programmed

The R & D team behind SKANTI's present satellite projects.

datagram. Since 1965 SKANTI has been the world leader in the field of maritime emergency transmitters. At first with the fabled Marinetta and later with the Marinetta TRP 1, of which more than 20,000 have been sold.

The other new SKANTI product for satellite communication is a mobile terminal, a ship earth station, which will also be capable of being used for point-to-point communication.

New generation of INMARSAT

In the autumn of 1990, the International Maritime

Satellite Organization (INMARSAT) launched its second generation of satellites. From their positions 36,000 km above the Equator over the Atlantic, Indian and Pacific Oceans, these three satellites receive, amplify and re-transmit signals from ships and from a network of coastal earth stations under construction.

Together with the COSPAS-SARSAT satellite system, developed by Canada, USA and the Soviet Union, (used by aircraft and polar expeditions) INMARSAT will be the backbone of the coming, global distress and safety system. The signals from the EPIRB transmitters are designed for the COSPAS-SARSAT satellites which, in contrast to the INMARSAT satellites, are orbiting and are at a somewhat lower height.

INMARSAT was founded and its shares are owned by the public telephone services in 50 countries. Its purpose is "to make provisions for the space segment necessary for improving maritime communications, thereby assisting in improving distress and safety of life at sea communications . . ."

Division into areas

Satellite communication will be used for both ship-to-shore and shore-to-ship traffic and the INMARSAT system will operate on the 1.5 and 1.6 GHz wave bands. The system will make two-way communication via telephone and data communication, including telex and facsimile, possible.

In developing GMDSS, IMO has had regard to the fact that the various radio sub-systems have their individual limits and that ships' communication equipment varies with the area of operation.

This is why IMO has defined four areas:
Area A1:
Within range of shore-based VHF coast stations (20 - 30 miles).

Area A2:
Within range of shore-based MF coast stations (excluding A1 areas) (in the order of 100 miles).

Area A3:
Within the coverage area of geostationary maritime communication satellites (excluding A1 and A2 areas) (approximately between 70° N and 70° S).

Area A4:
The remaining sea areas outside A1, A2 and A3.

In all areas of operation the continuous availability of alerting should be provided.

On the basis of this GMDSS division into areas, IMO expects that ships will be equipped as follows:

- Area A1 ships to have VHF equipment.

- Area A2 ships to have VHF and MF equipment.

- Area A3 ships to have VHF, MF and either HF or satellite equipment.

- Area A4 ships to have VHF, MF and HF equipment.

- All ships in A1, A3 and A4 to be equipped with satellite EPIRB.

- All ships in A1 to have either satellite EPIRB or VHF EPIRB.

Peter Ole Jensen, engineer in SKANTI's R & D department has followed the evolution of satellites closely and is a member of a research team involved in the two SKANTI projects - EPIRB equipment and a ship earth station for INMARSAT-M. He says, "SKANTI has equipment for ships in all four areas which GMDSS specify, but it is especially in Area A3 that satellite-based systems will come to compete with HF equipment. Depending on developments in the tariff policy for satellite communication, HF communication will remain not only an effective and justifiable communication method but also the cheapest. We have therefore decided to intensify the development of HF equipment. It is a global medium and, unlike the satellites, the ionosphere, which reflects the signals, is free.

SKANTI will provide its new HF products with the new facilities that will satisfy the GMDSS requirements. They will have to operate within the standardized protocol and this means, among other things, that the TRP 8000 will need the addition of Digital Selective Calling, which we were already prepared for during the design of the TRP 8000 series.

In the future it will be necessary to have 100% digital systems and by going into the INMARSAT project we shall extend our basic knowledge of this area.

We believe in the future of HF. Satellites create new possibilities but they are also vulnerable to abuse and destruction. Therefore, for military and paramilitary purposes and such things as a government's foreign service, there will always be a need for HF equipment of the high quality which SKANTI provides.

For SKANTI, therefore, it is not an either/or decision between HF and satellite communication. It is a question of both/and, and we intend to lead the way in both fields.

Developments continue

Developments in the field of communications are already directed towards future possibilities in the satellite area. With an orbit time of 24 hours at a height of 36,000 km, which matches the rotation of the earth, the INMARSAT satellites maintain a constant position, while the COSPAS-SARSAT satellites, for example, have a varying position, "skimming" the earth at a relatively low height.

These orbiting satellites will be of use in a coming Personal Communication Network, which will operate on frequencies between 1.6 and 1.9 GHz.

The Personal Communication Network (PCN) will be the future answer to the present cellular mobile telephone network, such as the NMT system in Scandinavia. Today a car moves from one "communication cell" to the next. In the future it will be the cell system that will move across the surface of the earth synchronous with the satellites.

This is just one of the many possibilities of the satellite. The changes which have occurred since the Soviet Union launched the world's first communications satellite, Sputnik 1, are a challenge to the imagination.

In following the technological development, SKANTI will continue to be a trendsetter.

SKANTI 1990

SKANTI passes its 25th birthday with positive development trends:

The extension of the main office with the R & D department as an integral part of it.

175 skilled employees, 30% of whom have been with SKANTI for more than 10 years.

Equity capital of more than 25 million DKK and a growing equity ratio.

SKANTI A/S is owned by the Belgian electronics group, SAIT Electronics S.A. with its headquarters in Brussels.

As the parent company for its marine activities in Northern Europe, the group has established the Danish holding company NAV-STAR A/S, which includes SKANTI A/S in Denmark and SKANTI RADIO A/S in Norway.

As it enters its 26th year, the Board of Directors of SKANTI consists of:

Mr. Henri Vander Eycken (Chairman)
Mr. Yves Schoonejans
Mr. Christian De Muynck
Mr. Peter Vange
Mr. Johannes Christensen
Mr. Per Johansen

Mr. Henri Vander Eycken and Mr. Yves Schoonejans represent the Belgian owners on the Board, while Mr. Christian De Muynck is the head of SAIT Marine International, the group's Belgian sales division on the maritime market. Mr. Peter Vange is Managing Director of SKANTI, Mr. Johannes Christensen and Mr. Per Johansen have been elected by the SKANTI employees in accordance with Danish legislation concerning employee representation on the boards of limited companies.

Management

Mr. Peter Vange has been Managing Director of SKANTI A/S since 1 April 1986 and in 1987 he also became Managing Director of NAV-STAR A/S. He is a member of the board of both compa-

nies, and is also Chairman of SKANTI RADIO, Norway.

The SKANTI executive team consists of:

Mr. Flemming Bruhn, Finance Manager
Mr. Johannes Christensen, R & D Manager
Mr. Arne Dan Frederiksen, Production Manager
Mr. Johan Hansen, Director of Sales

Geographical structure

Since 1967, SKANTI headquarters have been at 34 Kirke Værløsevej, Værløse, Denmark, but with the company's growth, it has been necessary to move certain activities to other addresses.

The factory in Frederikssund was built in 1972 and four years later it was nearly doubled in size. In 1982, the Stores and Dispatch department was moved to Ballerup.

The close contact between the R & D department, sales and management has always been given a high priority at SKANTI, but in 1986 there was such a shortage of space for the R & D department in Kirke Værløsevej that an independent R & D centre was established in Kirke Værløse, three kilometres from the head office.

Since then, permission has been obtained to extend the head office building. This will mean that the R & D department will be able to move back 'home' at the beginning of 1991, when the building will also be given a new external appearance, in keeping with the style and dynamism of the 1990s.

Employees

At the turn of the year 1990-91, SKANTI has 175 employees, 105 salaried staff and 70 on hourly rates.

Continuity and loyalty are the marks of SKANTI personnel. In connection with the company's 25th anniversary, Bent Bendixen of the R & D department will also be celebrating his 25th anniversary and within the next five years, eight of our employees will also be celebrating 25 years spent with SKANTI. Almost 30% of the personnel have been with the company for more than ten years.

Products

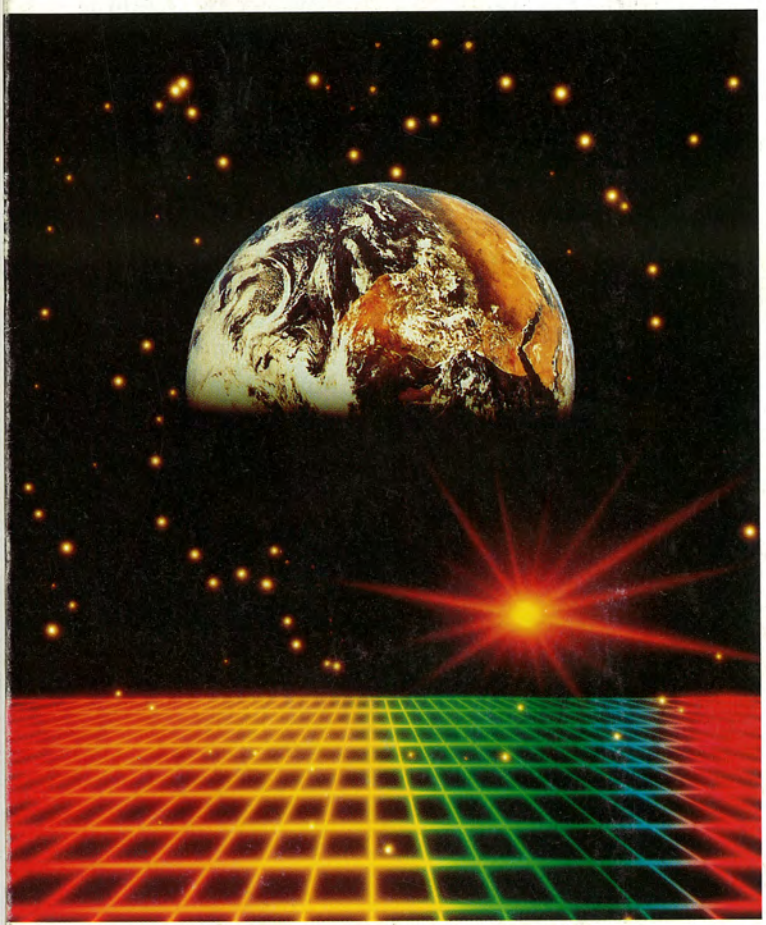
The TRP 8000 series constitutes more than 60% of SKANTI's total turnover and besides the two newest products, the VHF 3000 and the TRP 7000, the TRP 6000 set is still in production as is the watch receiver WR 6000.

The Marinetta TRP 1, which came onto the market in 1973, but with roots far back in the company's origins, still forms a respectable share of the production and represents more than 10% of the turnover.

Finances

SKANTI A/S has a share capital of 8 million DKK and an equity capital of over 25 million DKK. In recent years, the capital has yielded more than 10% annually.

Another key figure which has shown a positive development is the company's equity ratio, which has stood at over 38% during recent years.



SKANTI

– the trendsetter in radio communication

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