Emphasis on development

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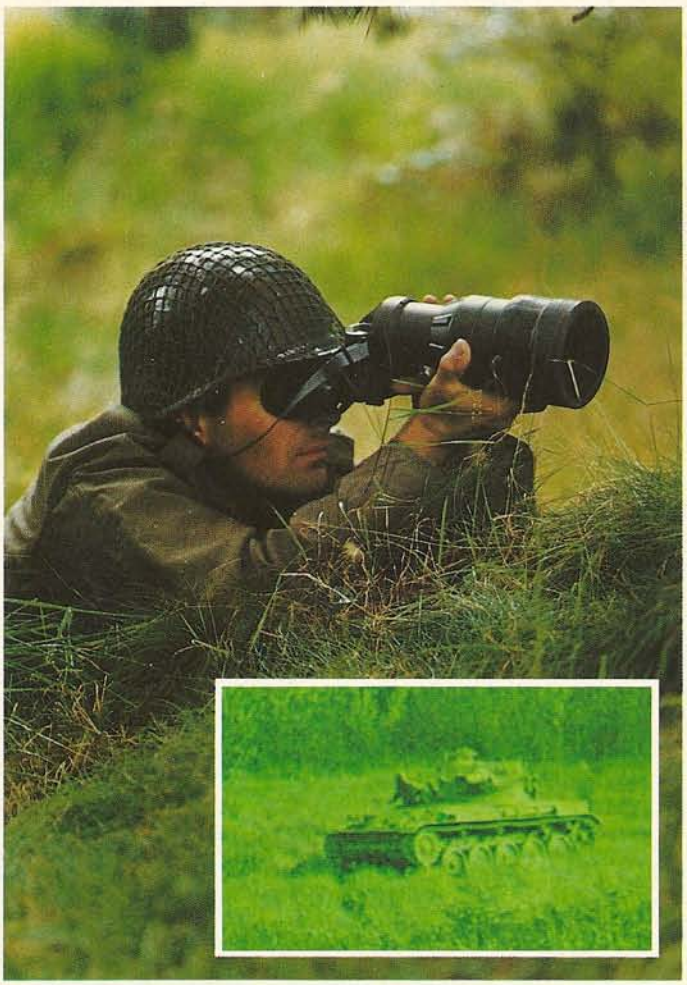
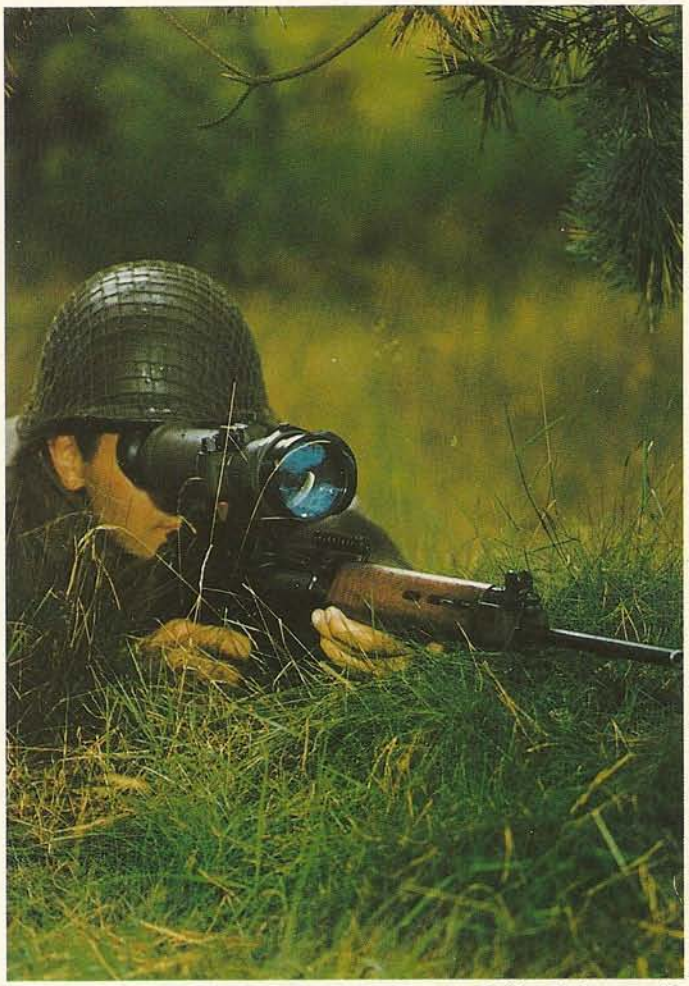


Philips USFA's second-generation binocular night observation sight permits clear observation at light levels as low as overcast starlight.



Second-generation infantry weapon sight by Philips Usfa permits target identification and accurate aiming in almost total darkness.

Philips-USFA: emphasis on development

Established more than 30 year ago on the basis of an agreement with the Dutch Government, Philips-USFA of Eindhoven has rapidly grown up to become one of the leading European companies in some key fields of defence technology. As it is nearly traditional for some companies of the Philips concern, Philips-USFA usually keeps a rather "low" profile, and its capabilities are perhaps not fully understood worldwide.
In order to correct this situation, and to provide our readers with an in-depth description of Philips-USFA and its range of products, MT spoke with Mr. W. J. Heringa, Managing Director; Mr. M. van Dijk, Senior Marketing Manager; Mr. C. H. Elzinga, Senior Marketing Manager (crypto equipment); Mr. J. J. Verhoeven, Senior Manager (Marketing Support Group); and Mr. E. M. Verberk, Publicity Manager.

MT: *Could you please give us an idea of the nature and position of Philips-USFA within the Philips group?*
Mr. Heringa: Yes. We are a subsidiary of Philips, but we are legally an independent company. Philips USFA B.V. belongs to the Main Industry Group Defence and Control Systems (DCS) which is one of the professional Main Industry Groups of Philips such as Medical Systems and Data Systems. In the Netherlands we have two companies belonging to the Defence and Control Systems Main Industry Group: the bigger one is Signaal and the other is Philips-USFA. Other members of the group are located in Germany, the UK, France, Belgium, Sweden, and Italy. Managementwise I report directly to the management of the Defence and Control Systems Main Industry Group which is located in Hengelo. In turn, the management of this group reports directly to the Philips Board of Management in Eindhoven. Starting this year, we also have a Netherlands National Organisation, which is our "landlord".

MT: *Are the relations and links between you and your partners in the Philips group purely "vertical", in the sense that you all report to the same group, or are they also "horizontal" in the sense that you have cooperation agreements with them — you work together, and so on?*
Mr. Heringa: This is a very important question. The Defence and Control Systems Group is more or less a set of independent companies. We are all working on and tied to National security and other Governments' regulations in all of these companies. However, as part of Philips and because Philips owns the whole or part of the companies Philips has a say in that part of our activities which is not linked to governments' requirements. Of course companies will cooperate wherever this is useful. Also, each of us has the possibility to make use of the facilities within the Philips group. What is particularly important in this context is the fact that we can make use of Philips' investment capital and also the fact that we have access to all the information available within the Philips research laboratories.

MT: *Are you referring to the centralised research efforts, or to research in general?*
Mr. Heringa: To the central research. As a member of Philips, we have access to research results here in the Netherlands and in addition, to Philips research being done in the UK, France and Germany.

Philips USFA's universal night-driving passive periscope, available with a complete range of top prisma for installation in any type of armoured vehicle. Almost 30,000 of these periscopes have been supplied.

Philips USFA's thermal aiming and observation system for tanks and armoured vehicles. Inset shows stabilized mirror head mounted on cupola of LEOPARD 1 main battle tank.

MT: *Let's assume that a significant breakthrough in a sensitive field is made here. Would the result be immediately and automatically available to other member companies in other countries, or is that not necessarily so?*

Mr. Heringa: A very interesting point. I have already said that on the one hand we can cooperate, but on the other we are tied to Government regulations. Now, in principle if a government has paid for a certain development — I have to underline here that we do not carry out research at Philips-USFA, we carry on development — then it owns the results. For instance, if we want to make use of some technologies developed for the British government by our British partner, we have to reach an agreement with them, pay royalties and respect the British government's rules about where the product concerned may or may not be sold. So in general there is an organised transfer of technology. If on the other hand we are speaking about a programme funded by Philips, or specifically by Philips-USFA, then indeed the results can be made available to anyone we choose. This is for instance the case with a thermal imaging system that we developed on our own.

MT: *And what happens when you are actually able to transfer technology or patents to other members of the group? Do they have to pay royalties, or is the transfer "free of charge"?*
Mr. Heringa: They have to pay royalties, and act as a licensee of Philips-USFA. As far as technology transfer within NATO is concerned, we follow the guidelines mutually agreed upon in NATO. So, while we are able to exploit the advantages which stem from being part of the Philips group, we have to respect the same security regulations as any other firm working in the defence field.

MT: *You have stressed that Philips-USFA is a "development" company. What are the proportions of actual production and development activities?*
Mr. Heringa: Philips-USFA indeed puts a lot of effort into development. For instance, one third of our employees are directly involved in development and only one third is involved with actual production of hardware. Here again we have a big advantage in being part of the Philips group since we can make use of all Philips' production facilities — in fact our production is more final assembly, integration and testing than true manufacture. The remaining third of our workforce is concerned with management, marketing and general administration. So if you look at USFA, our strongest emphasis is undoubtedly on development.

MT: *So you have a structure that a fully independent company could not possibly afford?*
Mr. Heringa: Corrrect. About a third of our annual costs are represented by development.

It should be recalled, however, that we have to recover our investments. We are legally a self-supporting company, and this means that, like any other company, we must and do have a return on our investments in order to survive.

MT: *A "financially self-supporting company" sounds fine in theory, but is it also true in practice?*
Mr. Heringa: We are actually self-supporting, as already mentioned. Furthermore, I should point out that, since we make use of existing production facilities, both inside and outside Philips, our manufacturing force is small in comparison with more vertically integrated production organisations.

MT: *Do you do your marketing completely by yourself?*
Mr. Heringa: One of the fascinating aspects of working in this company is that we do *everything:* marketing, development, production, delivery, installation — the whole range. Here again, we have a very strong marketing thrust, by making use of all the facilities available for the Philips group anywhere in the world. In any country in the world there is at least an office where we can obtain local support for our marketing and sales.

W. J. Heringa (centre), Philips USFA's Managing Director, discussing the UA9053 thermal camera with USFA's Senior Marketing Manager M. van Dijk (left) and J. J. Verhoeven (right) Senior Manager, Marketing Support Group.

So if you want to go north, south, east or west there is support, communications and local information. Our philosophy is to work case by case and country by country, using our own representatives or Philips' local offices or agencies.

MT: *Is there any coordination to ensure that you do not compete against your partners for the same market? If so, at what level is the coordination done?*
Mr. Heringa: The answer is yes, there is coordination, about which I would like to give you some details. As we are independent profit centres, there is no price agreement between us. However, in most cases we do not compete on the market. We often meet with each other — there is a marketing coordination group for that — and we discuss the different situations. Since last year, we have agreed to steer our development in a complementary way, which is the best way to avoid internal competition. The objective is to come up with a full range of equipment in a couple of years. We could never completely avoid a certain amount of overlapping in products and the consequent possibility of competition, but our aim is to eliminate dual development and dual marketing.

MT: *It is true, however, that some of your partners are based in countries where the rules about defence export sales are far more liberal than here in the Netherlands — countries where a Government or Government-sponsored structure is available to support and push defence sales. Does this not put you at a disadvantage, compared with your own partners?*
Mr. Heringa: Yes, it does. Because of the regulations here in the Netherlands, we are often in a much more difficult marketing position than those companies of the group that are based, for example, in France, and the UK. However, it is completely impossible for us as a Dutch company to ask someone to sell equipment of ours to a country which is on the Dutch Government's embargo list. The rules of the game are that we have to ask permission from our Government, and we must clearly state the end user. Apart from special regulations which apply only to sales within NATO, we have to retain final responsability, even when we act as sub-suppliers. I think that it is very important to have rules such as these because, as you are aware, our main function is to contribute to the defence of the free world. We are not here to sell everything to everybody. We are fully aware of our position, and we feel responsible for that.

MT: *Is your whole product range defence-related and hence sensitive as far as export is concerned, or do you also offer equipment which is considered "commercial", say for police use and so on?*
Mr. Heringa: The only real commercial product we have is microscopes, which only represent about 1% of our sales, however. All the rest is defence products or defence-related material. We are trying to enter the non-military market, however.

MT: *For commercial reasons?*
Mr. Heringa: Yes, mainly because we need quantity production to make our equipment cheaper. I should explain here that we do supply equipment intended for police or customs use, but it is also considered as defence-related, and hence it is subject to the same regulations and restrictions as the purely military equipment.

MT: *Is Government approval required also for export of equipment when product development is done with your own funding?*
Mr. Heringa: Yes, this is the case for the whole range of our products no matter who pays for the development.

One of our main objectives is to be a reliable supplier within NATO. This means that we have to accept some limitations as regards the market areas in which we can present ourselves, but it has the important advantage that we are a reliable source of supply for our basic customers, namely the domestic market and Western Europe. It is part of our identity.

MT: *One third of your staff concentrated in development is a very high percentage. How much of this is sponsored by the Government, and how much is funded by yourselves?*
Mr. Heringa: It is very difficult to answer because the ratio varies from year to year. The average over the years is about 20% of our development outlay, although last year we received a very good Dutch Government contract. In general we prefer to be engaged by our Government in developments for advanced projects, and to agree about a common plan for realization. In such cases, payment of development costs becomes more an issue of financing and balancing risks.

MT: *But isn't a Government development contract also an advantage for you because it is very likely to end up in a production contract?*
Mr. Heringa: No. Here in the Netherlands, it is clear that if you accept a development contract, it will contain a paragraph stating that the award of a development contract has nothing to do with a possible future production contract. However, in practice it is evident that, if we do a good development job, we are in a rather good position to win a production contract if the decision to proceed with production is taken.

MT: *How and when was Philips-USFA established?*
Mr. Heringa: In 1949 the Dutch Government was looking for a Philips contribution in the development of electronic equipment. We not only have activities related to the Armed Forces' requirements, but we also developed secure communication systems for use within NATO.

MT: *Can you comment on your recent commercial results?*
Mr. Heringa: This is one thing we cannot give you. At Philips, we only publish consolidated figures in the annual report.

MT: *Are you satisfied with the commercial results of Philips-USFA?*
Mr. Heringa: I can tell you that we are growing. Since 1981 we have been experiencing a growth rate of 25 to 30% per year, and we are now at the level where we are a solid, profitable company. I already told you that we spend a lot of money on development, but still we are profitable. And that's good.

MT: *Could you perhaps provide some information about the number of your customers?*
Mr. v. Dijk: There are a lot. We have many customers in the free world.

MT: *All over the world?*
Mr. v. Dijk: Put it in this way: roughly speaking, 50% of our sales are represented by the Netherlands; of the remainder, part is internal sales to other companies of the Philips group, and part is export to foreign governments. In this last field our main market is in Europe, principally in NATO countries. Of course we are very proud of an important contract we won last year in the US, and we are also trying to gain a foothold in the friendly countries in the Middle East and elsewhere. We are a bit disappointed that sales

in the Far East are still not very satisfactory, although we foresee a growth in that market too.

MT: *The US contract you just mentioned — what is the development for?*
Mr. v. Dijk: We can say that it is in the thermal imaging area.

MT: *In the US?*
Mr. v. Dijk: Yes. We were selected after very stiff competition because we are less costly and could offer better performance and better delivery times. We were superior in all three key elements.

MT: *Is it correct to think of Philips-USFA as "optronic people" or do you also have important involvements in other fields?*
Mr. v. Dijk: Optronics is only part of the story. Turning now to products, a first point to be underlined is that we are structurally interested not only in marketing products to end users, but also in the sale of components for O.E.Ms.

MT: *As far as end users are concerned, do you also provide training and consulting, and so on?*
Mr. v. Dijk: Yes.

MT: *In your opinion, why has the night vision market grown so rapidly in the last five or six years? The last war was fought under the assumption that, with some exceptions of course, soldiers have to sleep at night. Now we have reached the point where each and every vehicle has to be fitted with night vision devices.*
Mr. Verhoeven: Quite simply, if you can operate only in daylight your operations are very limited. Now if you are trying to defend your country — provided that you can be sure that the enemy also sleeps at night — you could restrict yourself to daylight optics. The point is that, today, nobody is sleeping, and nobody is going to stop fighting in bad weather.

MT: *Can we now go into some details about your product range?*
Mr. v. Dijk: Certainly. We have four product groups: electro-optical, which for us means day/night vision equipment; secure communication equipment; proximity fuzes; and special batteries. The first two groups are presently the largest part of our activities as far as both investments and production are concerned.

Within the product range of the electro-optical group our most successful item, as far as cumulative sales are concerned, is the image intensifier driver's periscope, which is still in mass production and is fitted — or intended to be fitted — on almost all combat vehicles of the NATO armies in Europe. We have several licensees for it in Europe. This periscope is based on a very special one-stage image intensifying tube and is still a state-of-the-art equipment, as can be seen from its adoption for the LEOPARD 2 MBT.

Series production of this item was started in the seventies and is not yet coming to an end. For this type of equipment, the performance advantages offered by second generation tubes are marginal. However, the tubes — of which we use two for real stereoscopic vision — have a greater life than the second generation tube.

MT: *And what are you planning to offer for tanks of the LEOPARD 3 generation?*

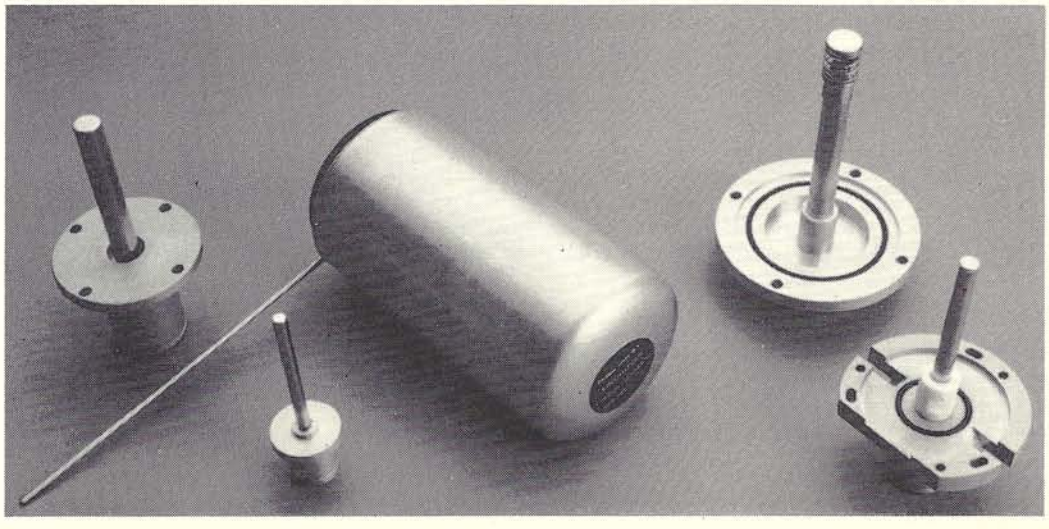
Mr. v. Dijk: Very good point! An important factor is that within the Philips group we are conducting development studies on thermal imaging solutions and on other solutions such as third or further generation image intensifying. We are following both directions, and we are not yet committed.

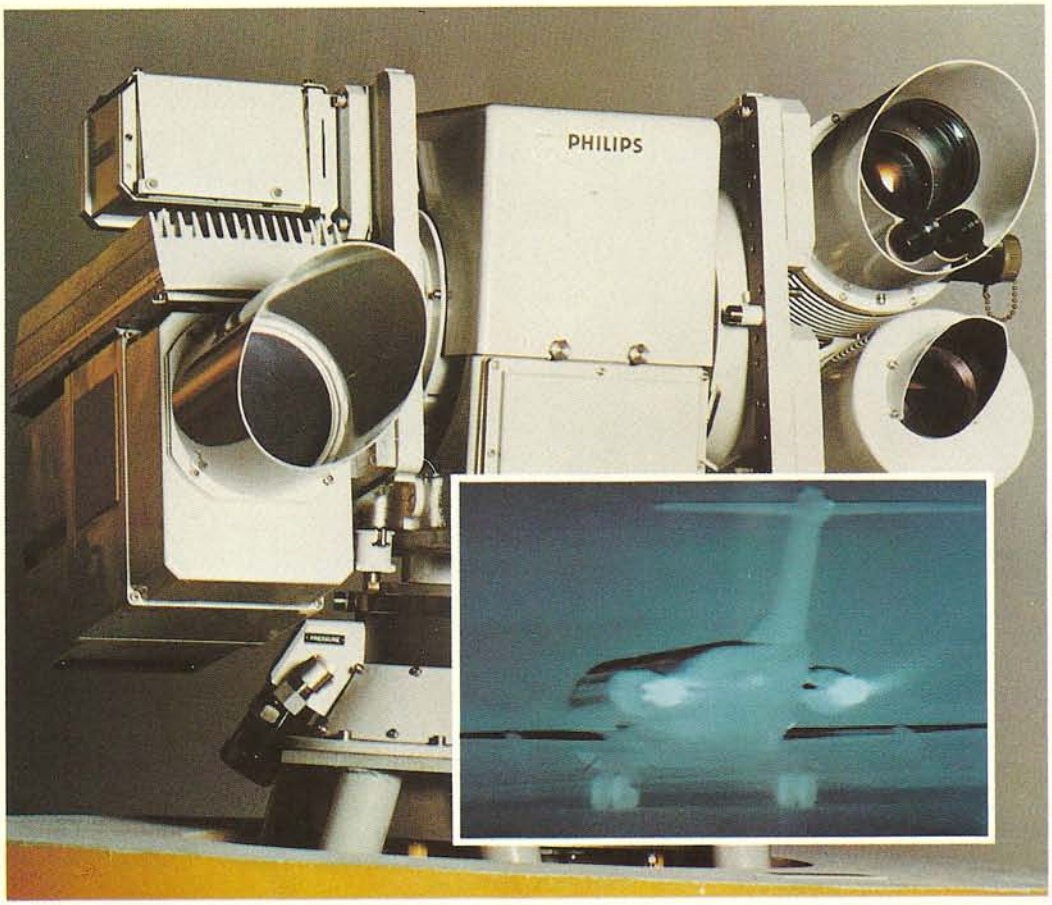
We are speaking now only about equipment and systems. We should like to mention that, in addition to selling equipment to military users and system manufacturers, we also sell components such as batteries, image intensifying tubes, and cryogenic coolers, to other equipment manufacturers.

MT: *Since you are working both with thermal imaging and image intensifying, we would like very much to have your views on the relative advantages and disadvantages of third generation tubes versus thermal imaging.*
Mr. Verhoeven: The pace of development of third generation image intensifier tubes is

Philips USFA's MINIFLEX compact high-grade crypto system in operation in the field. The lightweight transit case contains a complete terminal, with telephone and radio modems and a miniature printer.

Miniature Stirling-cycle cryogenic cooler developed by Philips USFA for cooling the detectors in thermal-imaging equipment. The unit is shown here in the "split" configuration with its range of cold fingers to match any Dewar/detector combination.





The 9LV100 director system manufactured by Philips Elektronikindustrier AB of Sweden, with the Philips USFA UA9053 thermal-imaging camera mounted at lower left. Inset shows a typical thermal image taken directly from the video monitor of the UA9053.

slowing down somewhat, mainly because the efficiency of the photocathode is not so high as was expected and calculated. Fantastic improvement factors were foreseen, but it now looks as if only marginal advantages could be gained for production equipment.

Mr. Heringa: There is also the financial aspect. If you plot on a graph the increase in performance offered by second generation over first generation, and by the third over the second in relation to cost, you will see that the shift from first to second generation represented an important improvement with an acceptable increase in cost, but that any minimal improvement in the step from second to third generation will result in high costs. Also because of the economic situation in Western Europe we question what is an acceptable cost/performance ratio for this type of equipment.

MT: *So you are planning on keeping a foot in both fields — third generation tubes and thermal imaging?*

Mr. Heringa: Of course, although thermal imaging offers the important advantages of better long range penetration, not only at night but also in any kind of obscured vision — it can penetrate fog, smoke, haze and so on.

MT: *There has been very little said on the possibility of designing thermal imaging systems whose sensors do not need to be cooled down to cryogenic levels. What is your opinion about that?*

Mr. Heringa: This has been the story of the last sixty years. Already twenty years ago we were trying to develop detectors that need no cooling, but this is a little bit difficult, because you have to go against the laws of physics. It is true that, for many people, cooling is the basic problem with thermal imaging, but this is only because they do not have the proper cooling system. Our cooling engines, whose series production started three years ago, have demonstrated extremely interesting performance. We and the users have kept them running for very long periods without any measurable degradation.

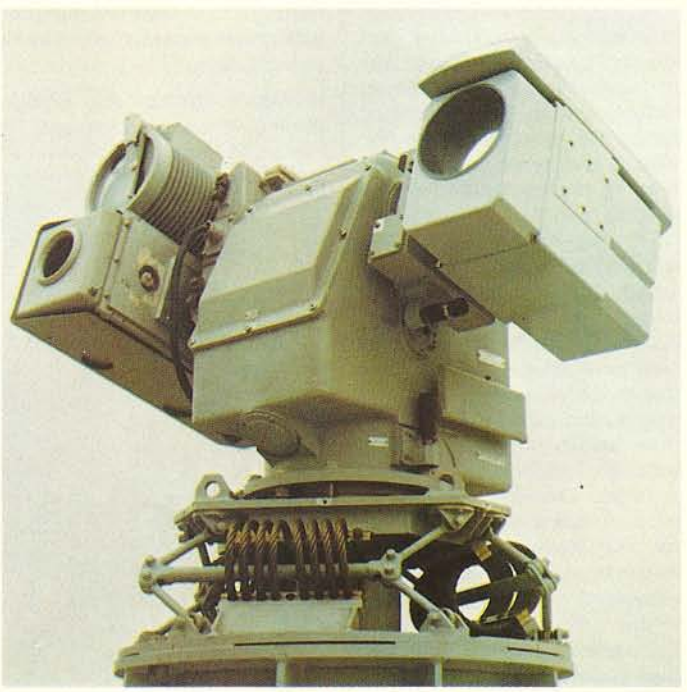
Mr. Verhoeven: Cooling engines in fact, are the equipment that we are also selling to the US. We are in direct competition with a US product and you will hear more about this matter in the very near future. MAGIEC will be our licensee in the US if our engine is selected. Because we took the right decisions in the past, we are now producing thermal imaging equipment of proven high performance. Philips currently has the most advanced fully-developed detector, and is the only company able to mass-produce linear-driven cooling engines. These engines can be interfaced not only with our detectors, but also with UK and US common module systems. We also have a very efficient scanning design. The scanner is another key factor in thermal imaging, and since in the past we decided to base our systems on TV-scan type presentation, we can make use of all present and future developments in TV technology, such as signal processing, recording and instant playback facilities. This point is of paramount importance if you look at what is happening in other countries which took a different approach in the past and are now compelled to develop huge "boxes" to make their systems TV compatible. We have a complete integrated "philosophy" in thermal imaging, something which cannot be said of all of our competitors.

MT: *What is the market situation of your thermal imaging systems based on the technologies you mentioned?*

Mr. v. Dijk: Our thermal imaging camera is in full production, and we actually doubled the production rate last year. Looking at the future, I am convinced that eventually all transport — commercial as well as military — will be equipped with thermal imaging systems. It simply no longer makes sense to have a large ship or passenger aircraft blinded by fog. The most important requirement is to reduce the price of such systems. Mark my words: within ten years, thermal imaging will be in widespread use for every kind of commercial application.

MT: *This brings us to an important point. In the field of image intensifying tubes there has been a dramatic drop in prices, both because of large-scale*

Philips USFA's thermal imaging camera UA9053 mounted on the Hollandse Signaal LIOD electro-optical director system.



production and improvements in design and manufacturing technologies, so that today a good second generation tube costs only a fraction of what a first generation did several years ago. Will something similar also happen in thermal imaging, or will prices for this equipment always remain roughly constant in real terms?

Mr. v. Dijk: No, prices will drop, and dramatically. But that should not be expected to happen tomorrow.

MT: *But how is this compatible with the difficult and costly production of the germanium optics?*

Mr. Verhoeven: Are you convinced that we will always use germanium optics? There is some good research going on in that area.

Mr. Heringa: The optics currently represent a large part of the total price of a thermal imaging sensor. The Philips laboratories have recently completed a machine for manufacture of aspherical lenses, which has allowed us to reduce the amount of germanium by about half — a very substantial cost reduction.

Mr. v. Dijk: And these are the possibilities *today,* without speaking about the future.

Mr. Heringa: One of the big things at Philips is that we have a centre for production technologies, where all the information gathered by all the companies within the Philips Concern are collected and made available.

MT: *There is at least a tentative trend towards development of panoramic surveillance systems based on thermal imaging, with the idea that such systems could eventually replace radar for some applications. What do you think about that?*

Mr. Heringa: Thermal imaging will always complement radar. With an active system like radar, you can penetrate adverse weather better than with any conceivable passive system. On the other hand, it is true that you can do a lot with thermal imaging. But radar too is developing, to the point that sometimes it is difficult to make a distinction. For instance, what is a millimeter wave sensor? Is it a radar, or some sort of "active" thermal imaging? The gap is closing. The differences between a passive millimeter wave sensor and a thermal imaging device are only marginal. At any rate, we are of course also studying panoramic surveillance systems, and a prototype is currently undergoing shipborne trials.

Philips USFA's universal proximity fuze for field artillery, shown here with its electronic time-setting device. The fuze (inset) can be used on any projectile fitted with the M572 cavity.

Although as I said, thermal imaging and radar will remain complementary, the sensitivity of thermal imaging and its capability to provide a true "picture" and not simply a symbolic presentation are extremely interesting for many applications, not only at night but in daylight as well. For example, after target detection provided by radar you can use thermal imaging for identification, and in many cases a thermal imaging picture can be a better navigation aid than a radar screen.

It is precisely because of this complementary capability that we have diversified development within the Philips Defence and Control Systems group in order to be able to offer the whole range of products we spoke about. You can have millimeter wave, thermal imaging, conventional radar, whatever you want. That's the strength of this combination — and we are talking about a Main Industry Group which has 12,000 people working directly in defence-related programmes.

MT: *Turning now to secure communications, what can you tell us about your activities?*

Mr. Heringa: You will appreciate, of course, that crypto is a very sensitive subject. What is already well known however is that in this field we are at the same level as producers in the major NATO countries, and that we compete successfully with them. Therefore all we can say is: yes, we are perfectly able to design and produce crypto equipment up to high security NATO standards. We also produce crypto equipment to non-NATO countries, and for commercial and industrial applications. It is also important to appreciate that we are involved in telex crypto equipment, voice crypto equipment, trunk encryption equipment etc. — the whole range of secure communications.

MT: *You have mentioned proximity fuzes.*

Mr. Heringa: Yes, we have two very efficient versions. The first is the fuze for land based artillery shells, the second is a fuze for naval guns, in which of course we concentrated our efforts on low level performance in order to provide a capability against sea skimming missiles.

MT: *A company which can afford such an emphasis on development and still remain profitable must be a strong company.*

Mr. Heringa: Yes, we are indeed a strong company, and one of our fundamental strengths is our product philosophy. Basically we have a systems approach, which enables us to participate as partners in integrated systems design on the basis of our expertise in electronics, physics, chemics and mechanics and our extensive hardware and **software know-how.** We also attach great importance to **quality** — of products and of **people** — and to our knowledge of the **market.**

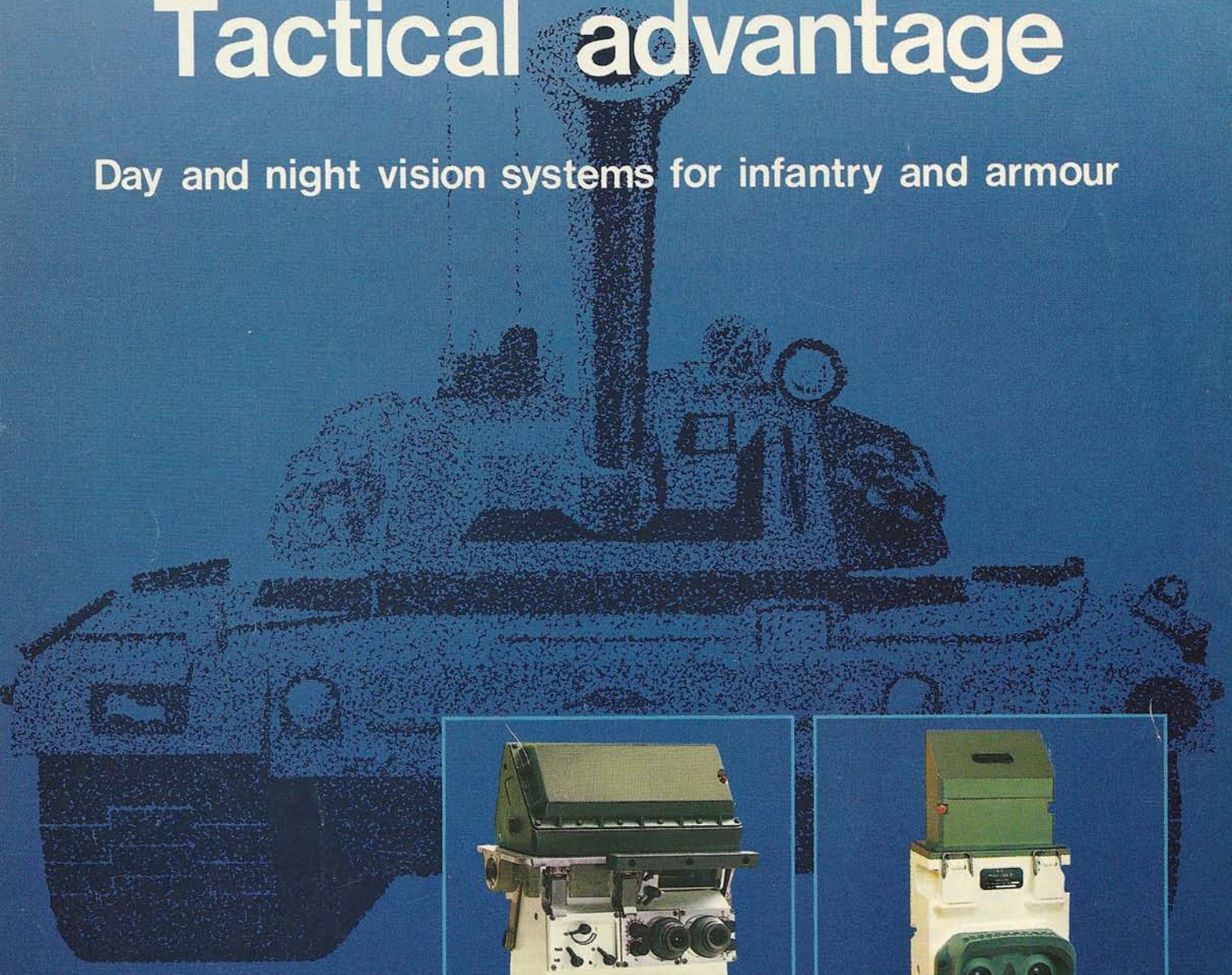
Our strategy as a company is to think **ten years ahead,** and not only to defend our jobs but **to create** new ones. Last year we grew by 30%, not simply in turnover but also in personnel — and even that was not enough, because we then hired additional temporary staff.

In conclusion may I say that the key points of my management style are **my belief in our people** and my conviction that they in turn believe in what they are doing. We are a compact company. We know one another, and we function as a **team,** motivated by our belief that we are making a **contribution to the defence of the free world.**

This Industrial Portrait was prepared through cooperation between Philips-USFA and the Marketing Dept. of the Mönch Publishing Group under the direction of Harald Helex. Editor: Ezio Bonsignore

Tactical advantage

Day and night vision systems for infantry and armour



UA 9126 Day/night periscope system

UA 9630 Driver's universal periscope

UA 9090 Thermal aiming and observation system

UA 1242 Night observation sight

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