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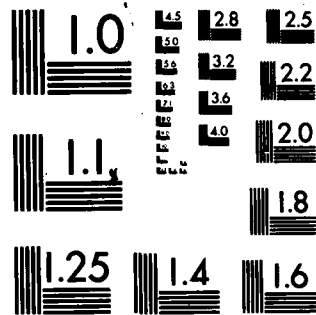
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ROYAL AIRCRAFT ESTABLISHMENT

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August 1983

**SWEDISH DEFENCE RESEARCH
ABSTRACTS 82/83-2**

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ROYAL AIRCRAFT ESTABLISHMENT

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SWEDISH DEFENCE RESEARCH ABSTRACTS 82/83-2

[FRÖ FÖRSVAR'S FORSKNING'S REFERAT 82/83-2]

by

National Defence Research Institute, Stockholm

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D.P. Barrett

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EDITOR'S SUMMARY

The Swedish National Defence Research Institute issues a quarterly list of unclassified Reports published by the Institute. The titles of these Reports and informative abstracts have been translated in English. This volume is the second issue of 1982/83. Further volumes will be translated in due course. The main topics covered are: protection - atomic, biological, chemical; ammunition and weapons; conduct of war, information and commands; vehicles and spacecraft; reliability and logistics; human factors; associated studies and their solutions; positive methods for limitation and control of armaments; psychology reports.

EDITOR'S NOTE

The Reports are in Swedish unless some other language is indicated (usually English). When requesting Reports it should be appreciated that an English version will not normally be available, and that the prices of the original Swedish documents have not been indicated in this Translation. Reports may be obtained from:

FOA Centraalkansliet, Box 27322, S1012 54 Stockholm, Sweden.



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A PROTECTION - ATOMIC

- (39) FOA report C30277-A
Influence of temperature on transient radiation effects on some CMOS circuits
Gunnar Göransson and Per Zamuhl October 1982

In a previous report (Transient radiation effects on some CMOS circuits in the 4000 series; G. Göransson, P. Zamuhl and B. Danielsson; FOA report C30250-A, December 1981) the results were reported of research on the transient radiation effects on some CMOS circuits in the 4000 series. This research was performed only at room temperature (about 22°C).

Supplementary research has now been carried out to gain some idea of how temperature influences the transient radiation effects on these circuits. Besides room temperature, the transient radiation effect has also been studied at both lower and higher ambient temperatures.

The circuits were studied in an environment of transient radiation with flash X-ray equipment at FOA 3 in Linköping. Irradiation was performed as a transient radiation dose at a dose rate of about 2×10^8 rad/s (total dose about 15 rad for 120 ns). The performance of the circuits was studied under different electrical conditions during the radiation pulse. Investigations were carried out at three different temperatures for each test condition.

The research shows that transient radiation can produce a relatively large effect on CMOS circuits regardless of high or low ambient temperatures (temperatures within the range specified for the circuit). This was also observed for radiation-hardened variants. The tests also show that the radiation effect varies with temperature, eg there is an increasing tendency to latch-up with increased temperature (a thyristor effect occurs, and there is a current surge through the circuit). The latch-up remains after the radiation pulse has disappeared, and the voltage supply had to be cut-off to extricate the circuit from the latch-up.

A3 Effects of nuclear explosions, and protective measures

- (40) FOA report C30298-A3
Studies of radioactive fallout - consequences and precautions
(Cfs skr 220-2956/81); secondary study: analysis of performance of a fibre-optic communication system in the fallout zone after nuclear explosions in territory adjoining Sweden
Sture Risberg and Olle Lagestedt October 1982 19

Government Bill 1981/82:102 includes requirements for the protection of the population from the consequences of the use of an ABC weapon in the close vicinity of Sweden. The present report attempts to illustrate some of the problems which new technology may produce in the field of telecommunications.

The report presents an analysis made of an article appearing in Tele, No.4/81 of activities on fibre optics in the telecommunication system. It explains some of the consequences for the reliable working of the telecommunication system using overhead fibre cables in the fallout after the use of a nuclear weapon beyond our frontiers. The report shows that the 'lifetime' of a fibre transmission system using overhead cable may be brief under some conditions of wind and weather, and that the time to recovery with certain choices of fibre may be long. If reliable communications are required over a

fibre network in areas affected by radioactive fallout, the risks have to be evaluated. The analysis demonstrates that certain choices of fibre, if risks in the fallout zone are not allowed for in designing the system, may involve serious consequences for the reliability of communication.

- (41) FOA report C30302-A3
 Effect of nuclear explosions on telecommunications etc (effect of EMP and ionising radiation on electronics and optronics)
 Sture Risberg and Gunnar Göransson November 1982

The report gives a detailed version of a lecture on 10 November 1982 at the FOA Review Day on the effects of nuclear weapons. After a brief summary of the parliamentary debate and of the view taken in the Defence Bill of maintaining data links and other telecommunications under the threat of war and in war itself, *eg* after nuclear explosions in our close vicinity, the report presents our own models of the development of an EMP field and its effects, mentioning some of the uncertainties in these models. An extract from an American Congressional Report is quoted, showing that the Swedish debate has its counterpart in the USA. Some examples are shown of the effects on electronic circuits which occur in the simulation of EMP and ionising radiation. An analysis of the performance of a fibre-optical communication system under the influence of radioactive fallout had been previously made at the FOA, and the result is briefly presented. A concluding chapter contains some views on the need for equipment to simulate the effects of nuclear weapons, with some examples of simulation methods.

C PROTECTION - CHEMICAL

C1 Threat scenario

- (42) FOA report C40160-C1
 Formation and spreading of explosive or toxic gas clouds. Some model calculations (in English)
 Stellan Winter and others October 1982

Large quantities of poisonous or explosive (or flammable) materials are produced, stored and transported daily in Sweden. In many cases these substances consist of condensed gases under pressures exceeding atmospheric. In the event of a leak a substance may emerge in an airborne form, when the cloud or plume from the leak may produce serious damage even at a long distance. Many of the major explosive, fire or poisoning accidents in the world have occurred by this means. A previous report presents a study of the literature to outline the state of knowledge regarding the processes which are instrumental in the formation and spread of explosive or poisonous gas clouds through the leakage of condensed gases. This report describes the adaptation and development of computer models with an account of some mathematical simulation projects. This work is an introduction to a planned catalogue with worked examples for explosive and poisonous gas clouds.

The mathematical simulations demonstrate that fundamental 'base models' of the issuing flow, turbulent jet, spread of heavy gases and neutral spread are required in order to describe the gas cloud which is produced by leakage from containers of condensed gas. In some special cases these 'base models' should be flexibly combined with special calculations (with or without complete models) *eg* for leakage inside buildings or for the leakage of heavy gases from chimneys.

C2 Protective measures

(43) FOA report C40163-C2

To determine the age for the use of No.36 protective jacket.
Lennart Sandberg, Eva Mauritzson-Sandberg (Umeå Univ)

November 1982

Testing of No.36 protective jacket was carried out at Umeå in Spring 1982.

Taking part in the tests were 122 children aged 2 to 7 years, divided into three age-groups: 2-3, 3-4 and 4-7 years.

The following main result was obtained:

1 In the 2-3 year group 30 out of 33 children refused to put the jackets on. However most of the children evinced curiosity and interest in the equipment. Despite this it was not possible even to begin putting on the jacket. In the 3-4 year group 16 out of 25 children refused to put on the jacket.

Finally in the 4-7 year group 20 out of 64 children refused to wear the jacket. The main cause of refusal in this group was lack of interest in the test as such.

2 No difference was found in reaction patterns, the home environment or the daily environment.

3 On comparing various materials in the jacket the children consistently preferred the thinner and more flexible version (PVC-coated nylon fibre) to the 'original model' (rubber-coated nylon fibre).

4 The protection worked well for children who developmentally had reached the 4-years level, regardless of chronological age.

Conclusions:

Jacket No.36 works as an acceptable protection for children from 4 years upwards. For children between 2 and 4 years old the protection, as designed at present, can hardly be considered as acceptable. It is however possible to get the jacket accepted by most 3-4 year olds if it is modified so that:

1 putting-on the jacket is made easier, *eg* by an opening in the back;

2 the sound level in the jacket is reduced so as to increase its comfort while being able to communicate with the child.

D AMMUNITION AND WEAPON TECHNOLOGYD1 Technology of explosives

(44) FOA report C20471-D1 (E4, F9)

The use of pyrophoric material in antimissile flares
Birgit Gelin

October 1982

Infra-red (IR) techniques are often used for missile guidance. The missile is fitted with an IR target-seeking device (IR sensor), to detect IR emission from the target and to pass guidance information to the missile's manoeuvring system. False targets, *eg* in the form of pyrotechnical flares, are used to mislead the IR target-seeker. In order to improve these anti-missile flares and render them more effective, an examination has been made of the suitability of pyrophoric material for this purpose. The report includes a description of certain pyrophoric materials, their methods of production and suggestions for the use of some pyrophoric materials as constituents in IR anti-missile flares.

The work was performed at the instance of FMV-F.

D2 Gunnery technology and associated ballistics

(45) FOA report C20472-D2

Mass-compensator gun. Computer program and computations
Sven-Erik Flygar

October 1982

Performance calculations have been performed for an anti-tank round of 10 and 13 cm calibre respectively, where firing is recoilless on the mass-compensator principle, and gas-tight by means of pistons, which are retarded to a 'soft' stop by the propellant gases. With a shot weighing 7.6 kg, a maximum pressure of 75 MPa and a total travel for each piston of 0.5 m, it is possible to achieve an initial velocity of about 150 m/s for a 10 cm calibre and about 200 m/s for 13 cm.

D3 Rocket engine technology and associated ballistics

(46) FOA report C20468-D3

Trajectory correction of free-flight projectiles by transverse firing of
sub-projectiles
Lars Ström

October 1982

End-phase correction of shells fired from guns is one alternative for reducing scatter at long ranges. The trajectory of the projectile is corrected, eg by jettison bodies which are blown loose from a cavity in the shell. The disadvantages, in the form of deformation in the shell cavity, which were revealed by initial tests of this method, have been eliminated in the process described in this report. By using a deflagrating explosive, greater impulses (at considerably lower pressure levels) have been achieved than by explosive correction methods. With acceleration paths of only 10-15 mm jettison velocities of 400-500 m/s can be attained, with operating times which allow the method to be used in rotation-stabilised shells.

The theoretical calculations have been verified by experimental tests. An account is given of a semi-empirical method which affords a simplification of dimensional calculations.

(47) FOA report C20475-D3

Hydrazine gas generation. Development of a hydrazine gas generator to drive a
rudder servo
Sixten Thorén

November 1982

The report begins with a brief account of the properties of hydrazine with additives, the catalyst Shell 405 and the reaction products from decomposed hydrazine (termed hydrazine gas in the report) and of systems powered by hydrazine gas.

It describes the development of a small hydrazine gas generator. The hydrazine gas so produced is intended to drive a pulse-fed low-consumption rudder servo for use in flying missiles. Tests of the combined operation of the generator and servo in the prototype are reported, with respect to the performance of the gas generator and the hydrazine gas.

D4 Technical aspects of warheads

(48) FOA report C20470-D4

Tests of the effect of an aerial shock wave on fittings, fixtures and
installations in shelters
Kjell Edin and Tage Eriksson

October 1982

The stress on a shelter wall by an external aerial shock wave may cause objects fixed to the interior of the wall to be thrown inward. This may injure people occupying

the shelter. The purpose of the series of tests reported here was to determine the behaviour of various fixtures for installations and equipment and how far such installations and equipment stand up to the stress. .

The experiments demonstrate that fixtures for radiators are able to keep them in position and that the efficiency of the radiators is not impaired. Out of the various light fittings which were tested one type was found to be totally unsuitable, while some others showed their robustness and suitability. Four types of fixing devices were tested. Some of them were susceptible to cracks which were formed in their support structure.

(49) FOA report C20474-D4(D6)
Penetration by small-calibre projectiles into a target medium. Program in BASIC for a HP-85 microcomputer
Dan Marttinen November 1982

The report describes a computer program which simulates a slender small-calibre projectile's behaviour in a target medium. The tumbling and retardation of the projectile are described by differential equations which are numerically integrated by the Runge-Kuttas method.

The program is interactive and will permit easy variation of the parameters. There exist a number of possible graphic outputs.

The program, which comprises 590 lines, occupies about 70% of the computer, including an extra plug-in store with an available capacity of about 30 kbytes.

Of course the computation proceeds slowly compared with a large computer. However this is balanced by great flexibility, simple operation and output and accessibility, which enable the program also to be used as an aid to evaluation in experiments under field conditions.

D8 System studies

(50) FOA report C20469-D8
A Navy time generator
Lars Lekzén October 1982

This report describes an electronic accessory for a digital clock. The purpose of this accessory is to generate timing pulses for a multichannel printer. According to the wishes of the customer (Sture Wickerts, FOA 263), these timing pulses should conform to the Navy system of watches and bells. For this reason the accessory has been provisionally termed a 'Navy time generator'.

(51) FOA report C20473-D8(F8)
RSAW - a computer program for processing and displaying geographical information
Rolf Skoglund and Anders Wellving November 1982

Studies are in progress in FOA 2 to find areas of possible application for what are termed geographical information systems, both for operational purposes and for battle simulation and computation of performance. A system of programs has been devised to process and display data structured on grid squares. The program is written in FORTRAN for the DEC-10 system in the Computing Centre, Stockholm. It can be used to create a database consisting of any number of 'overlays' of thematic information on topographical features. This database can then be used to construct maps to illustrate the going, effect of weapons, access to forming-up areas etc, depending on the type of information

which has been stored. The maps are displayed mainly on a graphic VDU and can be obtained in different scales and designs.

- (52) FOA report C20476-D8(E2, E3)
 Study of a position-finding system at Racal-Decca Survey Ltd, London (RDS)
 Sylve Arnzén and others November 1982

The report concerns experience gained from a visit to the UK in June-July 1982 to see Racal-Decca Survey Ltd, London (RDS).

The visit formed part of a continuing examination of possible means of acquiring a position-finding system for field studies by the Army. RDS was visited in order to obtain confirmation of whether the improvements undertaken by RDS have remedied the deficiencies and weaknesses which in the systems previously demonstrated had given rise to seriously inaccurate fixes of military units when tested on Swedish terrain. The demonstration produced largely satisfactory results. Some supplementary tests were subsequently performed by RDS.

Questions are discussed concerning the technical improvements. Coordination of the data streams from the position-finding and the existing systems of recording events and performance in field studies are considered.

Information is also included on the cost of the RDS position-finding system.

- (53) FOA report C20478-D8
 Photogrammetric method to determine geometric sight conditions
 Gunnar Simonsson (KTH) and Anders Wellving November 1982

The report describes a method for calculating geometric sight conditions by means of aerial photographs. The method was devised at the Technical University, Stockholm. It is based on the use of relatively simple equipment and is intended to measure masking angles around air defence positions, but it can be used in all situations where it is desired to determine the sight conditions around an observation post. The method was tested at FOA at the instance of the General Staff, from which certain conclusions were drawn as to the amount of measuring error, the ease of operating the method and its suitability to different applications. It was found that the measuring error is largely held within the stipulated limits, provided that the work is performed by an accurate and experienced operator.

- (54) FOA report C20479-D8(E3)
 A computer program in ADA for the control of a system incorporating an observer
 Sören Rundgren (KTH) December 1982

The task which was undertaken as an examination problem in control engineering, consists of designing a digital regulator incorporating an observer in ADA. The hardware consists of a Western-Digital microcomputer equipped with A/D and D/A channels. The premises at the outset of the work were that the implementation of ADA, present on the Western-Digital machine, is a section of the language as defined in the ADA reference manual Ref (3), and that the hardware required for communication with the outside world to and from the computer, with associated software in the PASCAL P-code, would be available during the course of the work. The work was seriously hindered because of errors in the ADA compiler. However the compilation of a source code was successfully completed after some extra work. Nevertheless the control algorithm did not function without error. The real-time clock-in package gave stack overflow 2 or 3 minutes from the start of

control. Dimensioning of the feedback amplification of state and digitalisation were performed on DEC-10 by a program known as ANSHE. The result of the control function is set out in Appendix 4.

- (55) FOA report C20480-D8
Description of types of ground in East Central Sweden
Ylva Lindgren and Anders Wellving December 1982
- Uppland, Södermanland and parts of East Gothland have been catalogued by means of the *REMEK* system, which is an aid to the classification and description of terrain which is divided into homogeneous types. The report describes the natural geographical data concerning the existing types of terrain. The geographical distribution of what are termed terrain patterns is illustrated in an appendix map to a scale of 1:800000.

E CONDUCT OF WAR - INFORMATION AND COMMAND TECHNIQUE;

- (56) FOA report C30278-E
Documentation of the microcomputer portion of a microcomputer-controlled frequency synthesiser
Peter Wirski October 1982

This report concerns both the hardware and software parts of the microcomputer portion of a 24-channel multi-frequency synthesiser. The actual generator consists of 24 'synthesiser cards' (described in FOA report D30136-E4, 'A synthesis generator' by Thomas Jarne). These 24 output channels are ultimately combined to form one signal in a combiner.

The documentation is divided into two main sections. The first section is for users of the system and it explains communication with the microcomputer. The second section (description of the design, program listing and appendices) is intended for those wishing to brief themselves on how the system is constructed in detail.

- (57) FOA report C30284-E
Acquisition of environmental data of the hydrosphere (in English)
Sören Palmgren July 1982

A brief review is presented of the state of development of methods and techniques for the collection of certain environmental parameters in the hydrosphere. It deals both with remote sensing and with '*in situ*' methods of particular interest. Examples of the development of methods are derived from current or recently completed research projects at research institutes for civil applications. Some parts of the information in this report have been presented in lectures on the subject.

- (58) FOA report C30285-E
Microwave tubes. Literature survey No.3 comprising 1981 (in English)
Herbert Steyksal September 1982

A new annual survey presents international R&D efforts for generating and amplifying microwaves. The report is based on about 560 references to articles in the specialised press and conference proceedings which became available during 1981. Most of the references are from the USA and USSR.

The review covers conventional tubes, *ie* magnetrons, klystrons, backward-wave tubes, travelling-wave tubes, magnetron amplifiers, triodes and also gyrotrons and lesser conventional designs such as EBS tubes, gyrocons, orotrons and free-electron masers. It

also discusses new methods of generating/amplifying microwaves including electron tube technology, including cathodes, electron guns and electron beams up to gigawatt levels.

E1 Reconnaissance, target location and fire control

- (59) FOA report B30055-E1
 Paper 6. Information extraction from images (in English)
 T. Orhaug and G. Forssell

The article discusses the collection of information by graphic sensors and the processing and analysis of such visual information. It also discusses the importance of geometrical resolution for the detection of objects in an image. The article goes on to deal with computerised image-processing and the results of image simulation at different resolutions from photographic pictures fed into the computer. These pictures are compared with actual pictures from Landsat (MSS at 80 m resolution and RBV at 40 m resolution). The report concludes with some results of detection experiments with different types of object.

Offprint from Outer Space - a new dimension of the arms race, edited by Bhupendra Jasani, pp 215-227, 1982.

FOA Reprints 1982/83:2.

- (60) FOA report B30056-E1
 Experimental studies with a coherent CO₂ laser radar (in English)
 Ove Steinvall and others

This article describes measurements of target signatures performed with a CO₂ laser radar of the homodyne Doppler type. The sensitivity of the receiver and the importance of the aperture area were studied. Measurements of target signatures include signal amplitude spectra, noise and mean signal levels. The probability of detection for different probabilities of false alarm were calculated by means of these measured parameters. Various types of target were studied. Sandblasted aluminium plates were used to simulate purely diffuse targets, and corner reflectors to simulate purely specular targets. Signatures were also studied from military vehicles and other objects of interest for the indication of flight obstacles, eg wire and frame structures. Comparisons were made with theoretical results for diffuse and specular targets.

Offprint from Proceedings of SPIE, (1981), 300, pp100-109.

FOA Reprints 1982/83:5.

- (61) FOA report B30057-E1
 Laser depth sounding in the Baltic Sea (in English)
 O. Steinvall and others

An airborne laser system was used for remote sensing of water depths in the Baltic Sea. Over 175000 laser pulses were stored on magnetic tape, equivalent to 5 hours' effective data collection. These tests were made over four different areas with different qualities of water. Simultaneous measurements of the transmission capacity of the water were made from a boat. Maximum depth penetrations exceeding 30 m were obtained, in good agreement with theoretical estimates. Sea measurements at Fifong showed good agreement between sonar and laser depths down to 20 m. The experiment demonstrated the high potential of laser bathymetry for measuring water depths and turbidity in Swedish coastal waters. A scanning system would yield a substantial reduction in costs and improve the data rate of marine measurement.

Offprint from Applied Optics (1981), 20, 19, 3284-3286.

FOA Reprints 1982/83:6.

- (62) FOA report C30271-E1
 Frequency stabilisation of a CO₂ waveguide laser (in English)
 Ingemar Renhorn and Martin Tideman April 1982
 A waveguide laser of 3 watt output power and resonance response of about 400 MHz was stabilised to peak intensity. A microcomputer was used as the control unit, and a frequency stability of 5 MHz was obtained. A large adjustment range was built into the feedback system. Various experimental requirements can be met by modification of the software. The fields of application requiring frequency stability are laser radar techniques and remote sensing.
- (63) FOA report C30281-E1
 Simulation of an adaptive passive hydrophone system July 1982
 Viggo Westerlin
 The performance of an adaptive passive hydrophone system on wideband signals was investigated by means of a computer, the target situations being constructed by simulated stochastic noise sources. Better accuracy of resolution was obtained than with a conventional hydrophone system.
- (64) FOA report C30289-E1
 Active parametric hydrophone system - information on the application of theory etc August 1982
 Tore Pentelius
 This report shows in greater detail how some of the theory can be applied which was previously presented in a report (FOA C30168-E1, November 1979). Among other items it shows how the wanted signals and programmable filters should be designed. An interesting supplementary theory is also supplied in Appendix A. In conclusion some planned experiments and possibilities for further development of the system are described.
- (65) FOA report C20390-E1
 Depth-sounding laser for locating oil below the water surface - a preliminary study August 1982
 O. Steinvall and others
 Reflections of green laser beams from oil were measured in laboratories and in a field test from the quayside. The measured results together with data from the literature were used to assess the possibility of detecting oil located below the water surface and hence invisible to the IR and radar search sensors in use nowadays. This type of oil has inflicted serious damage in the Stockholm archipelago and elsewhere.
 It should be possible to detect oil down to 10-15 attenuation lengths (*ie* 10-30 m for Baltic waters) if it is detected in continuous sheets covering the greater part of the cross-sectional area of the beam. If the oil occurs as small lumps it is presumably necessary for the overall cross-sectional area to exceed at least 1/10 of the beam area to ensure that the oil stands out against a background of back-scattered laser light from natural water.
- (66) FOA report C30291-E1, E3
 Millimetre wavelength emission from solid propellant rocket motor plumes (in English)
 Ain Sume September 1982

The report considers various physical mechanisms which may produce emission at mm-wavelengths (1 cm to 1 mm) from rocket motor plumes. Published data from detailed calculations of the conditions in exhaust plumes were used for quantitative estimates. The familiar Bremsstrahlung which arises through collisions among free electrons and molecules in exhaust gases is predominant throughout the wavelength range. Emission from solid particles of Al_2O_3 is difficult to assess, since there is a lack of data on their properties for the frequencies and conditions in question. It may be of importance at higher frequencies, although it is probably at least one order of magnitude weaker overall. The emission from molecular spectral lines of CO and H_2O and atomic recombination lines are probably weaker by several orders.

Calculations show that the equivalent black-body temperature of the plume from a rocket motor under test without Al_2O_3 may amount to about 700 K at 30 GHz, reducing to 230 K at 300 GHz. Qualitative agreement was obtained between these theoretical estimates and radiometric measurements performed at 35 and 94 GHz on three different motors.

- (67) FOA report C30295-E1
Creation of a road database from map overlays (in English)
Lennart Olsson and others September 1982

The report describes a development and implementation of programs which search a picture file containing roads, houses and boundaries. The roads on the input picture are identified, classified and traced out. Output data from the programs constitute road segments and their route lengths.

The report presents an examination study carried out at the Image Processing Branch of FOA 32.

- (68) FOA report C30269-E1, E2, E3
Information Technology 1982: Underwater techniques
Mats Bröms and others November 1982

The report is a survey of the use of information technology in underwater techniques. It opens with a review of the basic techniques such as radio, optics and acoustics, which form the basis of information techniques underwater. Hydrotechnical applications of information technique are systematised with comments on the advantages of using them. In conclusion a more detailed account is given of a number of special applications. These have been chosen with a view to their news value, and are also intended to illustrate the level reached by technical developments in the demarcated field.

This report forms part of the FOA 3 series on 'Information techniques' which is aimed at tracing in more technical and scientific detail the state of development and its trends in information technique.

- (69) FOA report C30297-E1, E3
Image-processing for low-resolution target-seeking devices
Bengt Kvärnstrom and Sven-Tuve Persson October 1982

One subsidiary problem in the feasibility study of an end-phase guided shell for use against marine targets was the study of target acquisition and tracking by means of a TV-CTD of dimension 32×32 pixels (picture cells). An assessment was made of whether this could be achieved by current techniques. The report describes algorithms for target acquisition and tracking, and it gives an estimate of the time taken by the algorithms described.

E2 Communications

- (70) FOA report C30276-E2, E3
Underwater techniques - report of a visit to USA in May 1982
Håkan Klevebrant and Sören Palmgren June 1982

A visit was paid to the USA under the heading of marine technology activities by FOA/STU. Apart from gaining a general impression of present-day marine techniques (OTC 82 in Houston), the visit was also intended both to update information on current development projects involving free-swimming and advanced remote-controlled underwater vehicles, and to acquire information on current activities in hydro-optics with applications to the propagation of light underwater, instruments for measurement *in situ* of optical quantities in seawater, optical fibre techniques and TV techniques.

- (71) FOA report C30299-E2
Steerable null antenna behaviour in terrain with heavy vegetation - a computer simulation (in English)
Lars Ladell October 1982

The present report concerns a two-element steerable null antenna and its characteristics in areas with strong fading such as terrain with dense vegetation. Fading in such terrain can be statistically characterised by means of the Nakagami-Rice distribution in the lowest part of the VHF band, *eg* 30-50 MHz, and with a Rayleigh distribution above 60 MHz. Significant wave components caused by reflection and scatter strike the aerials from all directions. Steerable null antenna equipment (SNAP) is assumed to be ideal with some type of phase and amplitude control.

One result of this computer simulation, perhaps rather surprising, is that a SNAP functions better against a jammer in areas with strong fading than in open country. This means that a SNAP might be developed which would yield a signal/noise ratio of several tens of decibels, regardless either of the bearing of the wanted signal or of the jammer.

Lecture delivered at the Aerial Symposium, Karlskrona 12-13 May 1981.

- (72) FOA report C30303-E2
Comparative antenna measurements in an actual environment: a steerable null antenna for 30-76 MHz
Folke Land and others October 1982

Steerable null antenna equipment, also known as SNAP (steerable null antenna processor) was tested in the field. The equipment, which is intended for use on vehicles, can suppress an unwanted signal arriving from any direction whatever.

From measurements made in open country an aerial diagram of the expected appearance was obtained with reduction of the interference signal by about 40 dB. This aerial diagram having either one or two distinct minima affects both the wanted and the jamming signal. A rather unexpected result was obtained from measurement in a wooded area with strong multipath propagation. The interference signal was damped as before in a direction determined by the resultant of the various components. The wanted signal on the other hand suffered no damping or only slight damping regardless of the direction of communication. This may be considered as a positive result of multipath propagation.

The measurements have largely been reported already by Telub, and the present report should be considered mainly as documentation of aerial measurements in an actual environment with the use of special techniques.

E4 Countermeasures, including signal interception and technical intelligence

- (73) FOA report C30286-E4
 Account of an investigation by interview and questionnaire on personnel training and development at FOA 3 in Linköping
 Lotta Forss October 1982

Background: The numerous duties of the personnel administration unit of FOA 3 include the more long-term and interdisciplinary training and development of personnel. The personnel unit has to obtain continuous information and ideas for any possible changes. This account, derived from interviews and questionnaires, forms part of this activity.

Object: The object of the task was to supply the personnel branch of FOA 3 with information and ideas for their future activity by means of an investigation using interviews and questionnaires. The questions included in them served the purpose of collecting attitudes of some of the personnel towards personnel training and development.

- (74) FOA report C30293-E4
 ULLE, multichannel data collection equipment adapted to the HP 9825 on-board computer
 Lars Bergström and others May 1982

A data collection unit has been produced in Branch 390 for connection to a Hewlett Packard 9825 desk computer (or 9845). This unit is connected to the computer through a 16-bit I/O interface HP 98032A.

Both analogue (12) and digital (3) signals can be fed to the equipment, which can then be supplied to the computer store in either a standard or DMA mode, and afterwards be stored on a cassette tape for immediate or subsequent processing. The input voltage range is ± 5 V.

The A/D converter in the unit has a 12-bit word length and a conversion time of 3.5 μ s. Data can be transferred in the DMA mode at a rate of 5 μ s per channel.

The report describes both the construction of the unit and its operation, and also the means of programming the computer for the various transfer modes.

Appendices contain among other things setting-up instructions and description of a filter unit comprising 12 filters, which is intended to be coupled where necessary before the data collection unit.

H HUMAN ENVIRONMENTH1 Human performance - active service environment

- (75) FOA report B40132-H1
 The design and experiences of MEDLOG - a system for medical care planning
 Ingemar Widegren and Staffan Löf (in English)

The report presents, chiefly in terms of the experience of system design and the performance of development work, a system of programs for simulation and computation intended to be used for the planning of medical care in wartime and the training of staff.

A feature of MEDLOG is that it requires only a brief introduction and it is very rugged and tolerant of technical hitches and operator's errors. The development work is designed with a balanced alternation between incremental extension and successive refinement.

Offprint from Medinfo 80, pp646-651, 1980.

FOA Reprints 1982/83:4

- (76) FOA report B54027-H1
Food from wild plants
Stefan Källman

A relatively large amount of attention has been paid recently to the medical uses of wild plants. However there has been very little interest in wild plants for food, the knowledge of this subject being very old and largely obsolete. Nevertheless some modern research has been started in recent years in Sweden, and in this article we have a presentation of some of the new findings.

Offprint from *Observanda Medica Ferrosan* (1982), 9, 82-87.
FOA Reprints 1982/83:3.

- (77) FOA report C40159-H1, C2
Field tests of a chlorine gas alarm
Erik Dahlgren and Lars Hägglund October 1982
Chlorine gas alarms were examined at three different installations, Umeå Simhall, Obbola Linerboard and the SCA Östrand chlorine works.

The investigations covered the inspection of noise levels and the recording of background signals from permanent alarms and from three other warning systems which had been examined previously in FOA 4 (FOA report C40148).

The results demonstrate that deficiencies exist both as regards the warning systems, the instruction on them and their maintenance and the inspection and calibration of their performance. The work was performed with support from the Committee on Industrial Safety.

- (78) Carbon dioxide retention inside motorcycle helmets (in English)
A. Aldman and others
Presented at the VIth International IRCOBI Conference in Salon de Provence (France), 8,9,10 September 1981.
- (79) Vibration and decompression gas bubbles (in English)
U. Balldin and A. Sporrang
28th International Congress of Physiological Sciences, Budapest 1980.
- (80) No effects of two nootropic drugs on memory and psychomotor performance during reduced air pressure (in English)
S. Levander and others
Report 1 from the Roche Clinical Unit, Stockholm
- (81) Enhancement of tolerance to sustained +G_z by positive pressure breathing - USAF view (in English)
John W. Burns and Ulf Balldin
Symposium on advanced aircraft oxygen system. 22nd meeting of ASCC working party 61, RAF Institute of Aviation Medicine, Farnborough, England, 17/18 November 1981.
- (82) The effect of training abdominal and leg muscles on the g-tolerance of air pilots
Ulf Balldin and others
PM October 1981, Karolinska Institutet and FOA 58.
- (83) Orthostatic reactions during recovery from heavy exercise (in English)
G. Rosenhamer and others
Abstracts of the 55th meeting (Autumn Meeting) 29 September - 2 October 1981, Innsbruck, Austria.

- (84) Formation of pulmonary telecystase when diving with an assault diving (oxygen) apparatus.
Gunnar Dahlbäck and Ulf Balldin
Transactions of the Swedish Medical Association, Acta Societatis Medicorum Suecanae Hygiea (1981), 90, 5.
- (85) The effect of strength training on the g-tolerance in air pilots
Per Tesch and others
Transactions of the Swedish Medical Association, Acta Societatis Medicorum Suecanae Hygiea (1981), 90, 5
- (86) Positive pressure breathing and a faster filling ready pressure anti-g suit: effects on +G_z tolerance (in English)
Ulf Balldin
Aerospace Medical Association, 10-13 May 1982.
Preprints of 1982 Annual Scientific Meeting.
- (87) +9 G_z protection with assisted positive pressure breathing (P²B)
John W. Burns and Ulf Balldin (in English)
Aerospace Medical Association, 10-13 May 1982
Preprints of 1982 Annual Scientific Meeting.
- (88) Improvements in g-tolerance following a strength training program (in English)
Per Tesch and others
1982 American College of Sports Medicine Annual Meeting 26-29 May 1982,
Minneapolis Auditorium and Convention Hall, Minneapolis, Minnesota.
Medicine and Science in Sports and Exercise (1982), 14, 2.
- (89) G-tolerance at +9 G_z with extreme assisted over-pressure breathing
Ulf Balldin and J.W. Burns
National Meeting of the Swedish Medical Association, 1-3 December 1982.
- (90) Effects of protection against G-induced pulmonary telecystases.
Ulf Balldin and W.A. Tacker Jr
National Meeting of the Swedish Medical Association, 1-3 December 1982

H2 Man and technical systems

- (91) FOA report A56004-H2
The role of ergonomics in the development of technical systems. A summary of, and some reflections on three reports (FOA reports C56026-H2, C56029-H2 and C56032-H2)
Hans Furustig October 1982

The choice of the subject of investigation is supported by arguments with respect to knowledge and to ethical and pragmatic considerations. The report is a disquisition and contains some preferences in systems theory.

Cooperation in the development of manned systems is regarded as one of the most important fields of activity in ergonomics. Two mutually complementary categories of criteria are involved in assessing an ergonomic approach, *ie* its theoretical and practical utility.

The working procedure in the ergonomics of systems is examined. The procedure has proved to be useful, though with certain subsequent modifications. It is limited by the circumstances in law, economics and the state of knowledge. The process of systems development has some irrational features which may impair the transfer of

knowledge and decision-making. Traditional working procedures in the ergonomics of systems fail to take sufficient account of the conditions of the transfer of knowledge.

Actual experience in ergonomic cooperation in systems development shows that ergonomic knowledge and ergonomic requirements are omitted from consideration to a surprising extent. Some examples are quoted and their likely causes are discussed. The ergonomist would have much to gain from being able to demonstrate the relation between ergonomic measures, the operational effect of the system and its total life cost. The importance of ergonomics to culture, society and the individual is discussed.

The result of developing a system is affected by the mode of approach. The ergonomist should possess familiarity both with scientific method and ideals and with the practice and ideals of the organisation. The method of work is governed both by aspects of method and aspects of cooperation. Among the negative factors which determine working conditions in an organisation which engages in the development of systems are mentioned dominance of method, dominance of knowledge, dominance of perspective, role conflicts, irrationality, constraints on action and communication barriers. With these circumstances in mind, the report concludes with some recommendations for the systems-oriented ergonomist.

- (92) FOA report C56033-H2
 Preparatory field tests in the spotting of air targets against the background of terrain
 Clemens Weikert September 1982

A field test was performed in order to study problems involving the possibility of visually detecting (in the optical sight) an airborne target displayed on radar and occurring against a background of terrain.

A Type 61 aircraft of the Artillery Support Squadron acted as the target aircraft and made 110 approaches divided into three different flight paths. The test was carried out by F10 with Hallandsåsen as the background terrain. Five test subjects performed target spotting through the periscope sight of a CIG 760. The range of detection was recorded in hm. The probability of detection in the test at ranges ≥ 60 hm is 5%. A 50% detection probability is obtained at 46 hm.

The results also demonstrate that the angular speed of the target and the angle of incidence of light on the target relative to the observer are the most important factors for rapid detection. The greater the angular speed, the earlier the detection. As regards the angle of incidence of light, it was found that front lighting is always more favourable than sidelighting. The effects of background luminosity and familiarisation are discussed.

- (93) FOA report C56034-H2
 Detection of airborne targets against background terrain: a laboratory experiment
 Clemens Weikert September 1982

A laboratory test was performed both in order to examine the possibility of studying the problem of the detection of airborne targets and background terrain by means of colour films and video tapes and to acquire further information of the factors affecting the detection range in an actual situation.

In an experiment designed for analysis of variance, in which the angular speed of the target and the angle of incidence of light on the target (relative to the observer)

varied, 60 test subjects were allowed to make observations of filmed flight paths, and 39 of them were also allowed to observe flight paths on video tape.

For flight paths on film the results show that the greater the angular speed of the target, the faster detection is made. As regards the angle of incidence of light, it may be stated that oblique lighting allows faster detection than back lighting, which in turn is better than side lighting. For video taped flight paths only the angle of incidence of light is critical, to the advantage of side lighting.

The laboratory test also shows that it seems likely that an acceptable simulation can be obtained with film, and perhaps also with video. Further development of the method methods reported here may afford detailed studies of the detection problem and the possibility of devising training equipment.

(94) FOA report C56035-H2
 Detection of airborne targets against background terrain: a field test
 Clemens Weikert September 1982

The field test was performed in order to study in detail the way in which the angular speed of the target, the prevailing illumination, the type of target and seeing conditions influence the possibility of visually detecting airborne targets against background terrain.

Sixteen test subjects made altogether 162 observations distributed among 18 different combinations of conditions (target type, angular speed and angle of illumination). Aircraft Types SK 50, helicopter Type 6 and aircraft Type 32 were used as targets.

The hypotheses formed on the basis of previous experimental results as to the effect of experimental variables on the range of detection were in general completely confirmed. The mean detection range for the experiment as a whole was 101.6 hm. The probability of detection within 60 hm was: for SK 50 85%, helicopter 6 91% and type 32 99%, while the detection ranges for 50% probability of detection were respectively 90, 103 and 111 hm.

H3 Man and social systems

(95) FOA report C55055-H3
 The perception of war by Swedish national servicemen (in English)
 Ben Shalit December 1982

By means of a Wheel Questionnaire the perception of war by 1067 Swedish national servicemen was recorded by causing them to answer the question: "What does war mean to you?". The study was carried out in seven infantry, four armoured and three fighter units in basic training. The test involved servicemen from at least two platoons in each of these units. Replies were analysed quantitatively using the following three indices: structure, commitment and sense of control. Each reply was also evaluated in three dimensions as regards content: who is disturbed or affected, what are the consequences and what sphere is affected. The result of the investigation showed that the men's answers varied with arm of the service both as regards structure and content. It was also possible to differentiate among units in terms of their perception of war. Units which are traditionally considered the best had the best values on the structure and control indices. They also had more answers with concrete contents and fewer with 'death'

as the content, which incidentally only about 26% of all servicemen had answered! The possibility is discussed, based on the results obtained, of measuring and developing combat potential in Swedish units.

- (96) FOA report C10216-H9 (M6)
 Group communication via computer: follow-up studies in social psychology on the KOM system in FOA
 Lillemor Adrianson (GBU) September 1982

This inquiry was conducted in order to gain information as to the mutually overlapping attitudes of KOM users to the system. The results show that KOM produces improvements in the work situation for its users where it involves the acquisition and dissemination of information and affords an increased circle of contacts.

Some of the workload had increased, mainly owing to the quantity of information. Some negative effects on social relations, integrity or democracy in the workplace and participation did occur to a small extent.

Productive conferences require a leader who keeps the discussion within the bounds of the subject and restrains any over-discursive discussion. A conference should consist of a sufficiently large group of people having a common need to communicate who actively participate in discussion.

M INTERDISCIPLINARY STUDIES AND INVESTIGATIONS

M1 Defence operational analysis organisation

- (97) FOA report C10215-M1
 Changes in the attitude to long-term planning. A literature survey and some views of long-term planning in the Army
 Jan Foghelin October 1982

A survey is reported of the literature on long-term planning and related subjects. An attempt has been made to summarise the changes in the attitude to long-term planning which have occurred over the last 10-15 years. The design of a suitable process of long-term planning is dependent on the situation. Some factors are dealt with which are critical for the organisation of this process.

In conclusion some views are given on long-term planning in the military services.

M2 Environmental and social studies

- (98) FOA report C10217-M2
 Objectives and standards of supply in economic defence
 Karl Henrik Dreborg and Anders Söderholm September 1982

The responsibility of economic defence is to adopt measures in peacetime so that there is security of supply under extreme circumstances. The objective here is not to be able to retain all peacetime production and consumption of goods and services, but it should be possible to ensure the most vital aspects of supply. This objective is expressed in terms of generally formulated aims. The guiding principle in planning is objectives which are linked to a programme, but whose connection with the generally formulated target is ill-defined in many cases.

Before Phase 2 of the 1979/80 future projection of the economic defence authority a draft guideline was worked out as to how to express the connection between the objective as generally formulated and the programme-linked targets. This was achieved by stating

objectives which overlapped the programme. The proposal for the overlapping objectives was documented in a paper in the Autumn of 1979 (second draft of 1.11.1979). This report is an edited version of the earlier memorandum. In order to be usable in studies and planning by the economic defence body, the draft guideline should be put into concrete terms for various areas of supply. A task of this nature was started during the studies on Phase 2 and the subsequent work of programme planning for 1980/81.

M3 Security aspects of environmental studies

(99) FOA report C10207-M3
The strategic balance, the MX system and shortcomings in the SALT talks
Håkan Karlsson April 1982

The present study is an evaluation of the unratified US-Soviet SALT II proposals on the limitation of strategic nuclear weapons with their implications for the stability of the strategic balance as the decisive criterion. From this standpoint the treaty is considered to suffer from some fundamental deficiencies.

An asymmetrical development of the strategic forces of the USA and the USSR and their military doctrines has caused some serious problems in security policy in the form of the increasing vulnerability of these forces, especially as regards US landbased intercontinental missiles, and a difference in military capacity between the nuclear arsenals of both countries.

The true extent and implication of this vulnerability is being keenly debated by western political and military commentators, but it is obviously of great potential importance for the relation of deterrence between the superpowers. According to the American theory of deterrence, invulnerable strategic retaliation forces broadly speaking constitute a basic technical precondition for durable strategic stability.

Hopes on the part of the Americans that the problem of vulnerability might perhaps be solved by the limitation of armaments have not been fulfilled. Even if the provisions in the SALT II treaty are observed, they cannot prevent the rise of a serious Soviet threat to the survivability of the American landbased missiles during the 1980s. The USA has therefore revived the question of a new and secure basing system for intercontinental missiles, and is at present developing what is called the MX system, whose ultimate organisation has not yet been decided. An agreement on arms limitation would contribute to solving the problem of vulnerability and strengthen deterrence by supporting the MX system. The assistance of the SALT II treaty is here considered to be very dubious.

(100) FOA report C10218-M3
Disturbing factors in the decision-making processes of foreign policy
Bengt Sundelius September 1982

The present report discusses various elements in the processes of preparation and implementation of foreign policy which may detract from the quality of decision-making. The main section of the study is devoted to a review of various potential disturbing factors which derive from limitations of the individual, the group structure and organisational effects. The purpose is to reduce the likelihood of these elements' affecting the attitudes of decision-makers, by presenting a frank account of the potential weaknesses in a decision-making process. The different disturbing factors have also been

summarised in tabular form in order to simplify the identification of any possible symptoms in one's own working environment. It also affords the possibility of relating the analysis to actual decision-making situations by associating the factors in question with various types of decision.

The study forms part of the "Project on theory".

(101) FOA report C10220-M3
Iraq's options after the war with Iran
Gösta Tompuri

October 1982

The purpose of this study was to investigate and analyse the alternative courses of action open to Iraq both during and after the war with Iran. The article is introduced by a basically geopolitical consideration of the imperatives facing Iraq in her policies concerning security, development and trade with respect to the outside world, both in the regional and global contexts. Particular importance is devoted to Iraq's problems of supply, as an almost completely landlocked country. This means that Iraq is clearly dependent on friendly relations with her neighbours for her contacts and foreign trade with the outside world.

There is much to indicate that the state of war between Iraq and Iran may come to be institutionalised into a permanent one on varying, though generally low levels. This would mean that Iraq's abilities to use the ports in the Persian Gulf will be slight. This in turn would compel Iraq to pursue an extremely costly development of the country's 'strategic infrastructure' with roads, railways and oil pipelines to the Indian Ocean and Red Sea, in other words a realignment of foreign policy priorities from the Eastern Mediterranean (Egypt, Israel/Palestine, Lebanon and Syria) to the states on the Arabian peninsula.

This study forms part of the AIS project.

T CERTAIN MEASURES FOR LIMITATION AND CONTROL OF ARMAMENTS

T1 Seismological multiple stations

(102) FOA report C20477-T1
Research on Swedish earthquakes 1980-1981
Ragnar Slunga

(in English)
November 1982

This is a report of research on Swedish earthquakes recorded between December 1979-1981 by the digital seismic station network in southern Sweden operated by the FOA. The high quality of the data collected makes it possible to determine the source mechanisms of all the earthquakes which were recorded. A method is presented based on both the polarity of the initial movements and their spectral amplitudes. Besides determining the possible planes of displacement and the seismic moment of force, angular frequencies, source dimensions, stresses and maximum displacements are determined for 53 Swedish earthquakes. Epicentric ground movements are studied and a relation is proposed for 2-parameter scaling (seismic moment and stress) and tested for maximum accelerations in free rock. A horizontal NW-SE compression by source mechanisms is indicated. Topographic lines on the surface of the earth are often obtained in agreement with the derived plane of displacement. The frequencies, epicentres and distributions by depth and maximum ground accelerations are in good agreement with earlier studies of seismic risks.

EMERGENCY COUNCIL FOR PSYCHOLOGICAL DEFENCE

- (103) BN report No.112
Films, society and propaganda
Kate Betz and others
March 1982

This paper contains three studies of mutually widely differing periods in the history of film propaganda. The first concerns the Soviet agitprop film between 1917-1921, "the first attempt to tailor the use of a mass medium to political ends". The second deals with the attempt made in neutral Sweden during World War II to maintain a spirit of readiness with the aid of film. The third illustrates the use of film by the USA and USSR in the campaign of mutual hatred during the cold war.

- (104) BN report No.113
Persuasion by speech
Rolf Hedquist (Umeå Univ)
June 1982

A review of spoken means of influence based on the classical rhetorical tradition but taking account of modern research. It is supplemented by examples of how three foreign radio stations, Radio Moscow, Radio Berlin International and Radio Poland have availed themselves of this means of influence in their broadcasts in Swedish.

- (105) BN report No.114
Attitudes to society, security and defence
Kurt Törnqvist
June 1982

This report on the official survey of public opinion during spring 1981 gives a picture of Swedish attitudes after the submarine incident at the end of October 1981 and the assumption of power by the military in Poland in December 1981. The survey covers an assessment of attitudes to society, the superpowers, concern at political tension and the perception of the risk of war, confidence in the defence services, the defensive spirit, the response to the cost of defence and disarmament.

- (106) BN report No.115
Analysis of radio broadcasts
Rolf Hedquist (Umeå Univ)
October 1982

This report comprises 13 analyses of Swedish-language transmissions from Radio Moscow, Radio Berlin International and Radio Poland. It forms a conclusion to our project on speech and persuasion, the first part of which was reported in report No.113. It illustrates the possibilities which exist of supplementing political analysis by an analysis of language in terms of foreign propaganda directed towards Swedish public opinion.

- (107) BN report No.116
Opinion 82
Kurt Törnqvist
December 1982

This is an account of the opinion survey carried out in the autumn. Results are reported concerning the public's attitude to society, politicians and parties, the mass media, superpowers, concern at political tension and the perception of the risk of war, confidence in the defence services, the defensive spirit, the attitude to the cost of defence, and to disarmament.

- (108) BN communication No.95
The Emergency Council and the submarine
Per-Axel Landahl
March 1982

This communication contains an account of four studies of the Soviet submarine in the Blekinge Skerries at the end of October 1981. The first deals with the rapid survey of opinion undertaken by the Emergency Council in November 1981 immediately after the submarine incident. The second concerns certain aspects of the press and the submarine, while the third contains reporting on the submarine by Radio Moscow. The fourth describes how the submarine incident was reflected in international mass media.

- (109) BN communication No.96
 Research information and comprehension
 Jan Svensson (Lund Univ) August 1982

In this communication a philologist reports on some of the questions which may be raised in connection with research information and its comprehension. He discusses some of the problems which may emerge for the scientist, for the journalist and for those expected to receive the information.

- (110) BN communication No.97
 Evaluation of news and scientific journalism
 Håkan Hvitfelt (Gbu) September 1982

All events which become news in the mass media pass through a decision-making process, with the result that some kinds of event get plenty of space, others only a little, while much of what happens never gets any coverage whatever. This communication offers a review of the factors which affect the presentation of news.

- (111) BN communication No.98
 True and quick?
 Jan Skoglund September 1982

This communication is a study of the transmission of news from the Falklands war, the conflict between Great Britain and Argentina. The object of the study is to compare the official communiqués of the antagonists and to study their content and times of publication.

- (112) BN communication No.99
 A mysterious unidentified underwater object
 Rutger Lindahl and Claes Lundgren (Gbu) November 1982

This communication presents the view of Radio Moscow of the search for the submarine in the skerries off Stockholm in autumn 1982, as expressed in Swedish-language broadcasts by that station. The report is supplemented by an appendix of quotations with *verbatim* extracts from Swedish-language broadcasts by Radio Moscow.