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SWEDISH DEFENCE RESEARCH ABSTRACTS 1982/83-4 (FROE
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ESTABLISHMENT FARNBOROUGH (ENGLAND) FEB 84

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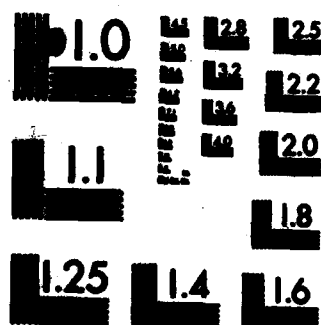
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ROYAL AIRCRAFT ESTABLISHMENT

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February 1984

**SWEDISH DEFENCE RESEARCH
ABSTRACTS 1982/83-4**

by

National Defence Research Institute, Stockholm

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SWEDISH DEFENCE RESEARCH ABSTRACTS 1982/83-4

[FRÖ FÖRSVAR'S FORSKNINGS REFERAT 1982/83-4]

by

National Defence Research Institute, Stockholm

Translation edited by

M.G.B. Weedon

EDITOR'S SUMMARY

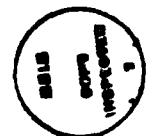
The Swedish National Defence Research Institute issues a quarterly list of unclassified Reports published by the Institute. The titles of these Reports and informative abstracts have been translated in English. This volume is the Fourth issue of 1982/83. Further volumes will be translated in due course. 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:

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A **PROTECTION - ATOMIC**

A3 **Effects of nuclear explosions and protective measures**

(152) FOA report C30321-A3

The effect of ionizing radiation on some different optical fibres
Lennart Lindström

May 1983

Experimental results from absorption-measurements on five different types of optical fibre exposed to γ -radiation from a ^{60}Co -source in doses between 0-500 rad-Si are presented.

Comparisons with other similar investigations are made and the physical background to light-losses caused by ionizing radiation is given in short form.

C **PROTECTION - CHEMICAL**

C2 **Protective measures**

(153) FOA report C40171-C2, C3

Proceedings of the International Symposium on protection against chemical warfare agents (in English)

Per-Gunnar Jönsson, Kurt Persson, Johan Santesson, Bertil Lennertorp (FortF), Rolf Palmäus (FMV) and Jan Schyllander (Cfs)

June 1983

The report contains the proceedings from the International Symposium on protection against chemical warfare agents, which took place in Stockholm, 6-9 June 1983. The papers were presented during sessions entitled Detection, Medical Protection, Respiratory Protection, Decontamination, Civil Defence and Collective Protection and Miscellaneous.

For technical reasons the deadline for submission of manuscripts had to be changed at a very late stage, and therefore only abstracts are available of some papers. However, a supplement containing the remaining full papers will be published during the autumn of 1983.

(154) FOA Report D40106-C2

Physiological testing and vulnerable space for two civilian protective masks for children
Gunnar Dahlbäck

June 1983

C3 **Injuries and treatment**

(155) FOA Report A40044-C3, C1

The efficacy of antidotes as measured by receptor binding
Britt Karlsson, Åke Sellström and Vivianne Ögren

April 1983

With the aim of quantifying the efficacy of an anti-cholin-energetic antidote, the method using ^3H -QNB to measure affinity at the muscarinic receptor was developed.

The affinity at this receptor of atropin and benactysin was compared and found relatively similar.

(156) FOA Report C40170-C3

The effect of cadmium on transmitter transportation
Lennart Estborn, Birgitta Olofsson and Åke Sellström

April 1983

The effect of cadmium (Cd) on a 'rate-limiting' step in neurotransmission; the transmitter inactivating high-affinity γ -aminobutyric acid (GABA) transport was studied.

The uptake of ^3H -GABA into isolated pinched-off nerve-terminals was totally suppressed at Cd concentrations above 10^{-4} M. This effect was probably due to an indirect effect on the neuronal membrane potential.

D AMMUNITION AND WEAPON TECHNOLOGY

D1 Technology of explosives

(157) FOA Report C20495-D1(D3)

Service life test of booster for RB 53
Anders Schwartz and Bert Andersson

May 1983

Tests have been made on 12 year old boosters for a missile RB 53. Static firing of motors has been performed at -40°C , 20°C and 60°C with registration of burning time and thrust. Burning rate of the propellant has been measured as a function of pressure at the same temperatures. Results show that no change of properties has occurred during the time the rocket motors have been stored.

D4 Warheads technology

(158) FOA Report C20488-D4

Blast wave measurements from detonating spherical 8.4 kg comp B charges
Inger Åseborn

April 1983

Air blast wave measurements have been made at distances 4-17 m from detonating 8.4 kg spherical Comp B charges suspended at 0.75 and 1.0 m over a plain ground surface. Pressure-time histories, peak pressures, durations and impulses are presented. A comparison between similar measurements from detonating TNT-charges is also made.

(159) FOA Report C20491-D4

Finite cylinder-symmetric expansion of a hole in an unbounded elastic-plastic medium
Hans C. Strifors (in English)

April 1983

The state of stress and the dissipation of energy ensuing upon hole formation due to internal pressure and axial shear traction in elastic-plastic materials are obtained for a simple continuum mechanical model. The results are applicable to projectile penetration into armour material. There is demonstrated the risk of initiation of brittle fracture in strain-hardening materials, which on occurrence in an armour would deteriorate the capability of arresting a piercing projectile.

(160) FOA Report C20496-D4

Description of a calibrator for piezoelectric pressure transducers
Tage Eriksson

May 1983

The report describes a compressed air calibrator for pressure transducers. The maximum pressure is 10 MPa and the risetime of the pulse is about 30 ms.

D6 Protection against warhead effects

(161) FOA Report C20490-D6

Spread of fire gases and smoke between two residential rooms
B. Onnermark, R. Jansson, L-E. Altvall and K. Halversson

April 1983

By experiments, was studied the spread of fire gases and smoke between a fire room and an adjacent room through a door opening. The purpose of the investigation was to produce test data to mathematical fire gas spread models.

At the investigation five components of the fire environment were measured: O_2 , CO, gas temperature, soot particle concentration and optical smoke density. Two kinds of fuel were used in two quantities - fire wood, wood/polyurethane flexible foam, 10 and 20 kg. The measured results in the two rooms are given in diagrams. In a separate investigation the relationship between soot particle concentration and optical smoke density was studied.

- (162) FOA Report C20501-D6
A room fire simulation model (in English)
Bengt Högglund

A computer model for simulating the early fire growth in an enclosure is described. The enclosure is assumed to be divided into distinct homogeneous zones. The rate of heat release is defined for the fire and the conservation equations are solved for the zones, yielding the temperature and radiant heat conditions in the fire room. Results of the model are compared with measured data of the burning of wood and plastic cribs in an enclosure, showing a good agreement between measured and calculated results.

This work was financially supported by the Swedish Fire Research Board.

D8 Systems studies

- (163) FOA Report A20032-D8
Aerosol clouds and their transmission properties - research, models and applications (in English)
Sven Wahlborn May 1983

The starting point for this report is the physical fact that all aerosols attenuate radiation passing through them. Hence, models for the understanding and description of related phenomena have wide use in many areas, such as environmental research. The aim of the report is twofold. On one hand, the aim is to give an account of theories and models for the study of optical transmission pattern in aerosol clouds, on the basis of the attenuation characteristics for aerosols and the dispersion properties of clouds. Methods of computation and measurement are described. On the other hand, the aim is to furnish a 'state of the art' account of the research on aerosols and aerosol clouds with special regard to its applications and related systems approach. In particular, military applications - the use of protective aerosols - are reviewed.

This report has been written to serve specialists (transmission models and measurements) as well as non-specialists (basic descriptions and overviews). It is noted, as one conclusion, that satisfactory competence is available in Sweden to acquire and analyze basic data for various properties of aerosol clouds. However, in this country, there is little coordination of the resources for applications and problem oriented work.

- (164) FOA Report C20493-D8
Calculation of fire gases by thermochemical equilibrium computations May 1983
Sven-Erik Flygar

Equilibrium compositions of fire gases from wood and plastics, burning in air, have been calculated for different air/fuel ratios both at the adiabatic flame temperature and at lower temperatures down to 400 K. The results are meant to be used as a reference frame for comparison with measured values, not for prediction. It is also shown that direct agreement cannot be expected except for special circumstances. This study has been sponsored by the Swedish Fire Research Board.

- (165) FOA Report C20499-D8
Experiences, etc from work within the area protection and protective systems June 1983
Bernt-Olof Engström

The report contains experiences, foundation, personal opinion about certain questions, etc from work within the area protection and protective systems, against, above all, the optronic sensor threat.

E INFORMATION AND COMMUNICATION TECHNOLOGY

- (166) FOA Report C30313-E
High frequency mixers
Åke Bergquist

February 1983

The report gives a summary of the microwave mixing-technique and its present status at very high frequencies. Most mixer-types of interest are discussed. In conclusion an account is also given of the work with a single-balanced mixer in the 35 GHz-band.

- (167) Report C30318-E
Microelectronics - report from a conference and visiting trip to Japan 1982
Bertil Sigfridsson

April 1983

The paper is a report on a visit to Japan in 1982 including attendance at semiconductor device and technology conferences and a visit to the University of Tokyo. The purpose was to follow the development of microelectronics especially in relation to vulnerability to ionizing radiation. One impression was that one may expect that latch-up free LSI-circuits resistant to sea level cosmic radiation will be available on the commercial market. Since radiation damage due to ionizing radiation occurs in VLSI-processing the awareness and knowledge of radiation effects will increase considerably among manufacturers. This fact may in general have a positive effect on the vulnerability of modern electronics to ionizing radiation.

- (168) FOA Report C30323-E
Sequential operations for obtaining distance functions in digital pictures in
arbitrary dimensions (in English)
Gunilla Borgefors May 1983

In many applications of digital picture processing distances between the picture elements must be computed. The growing interest in digital picture processing in higher dimensions makes it essential that such distances are available there too. In today's working environment, sequential operations are often the most efficient way to compute these distances. Four different families of distance functions are presented, each with its advantages and drawbacks. The results and algorithms for all four distances are presented in detail in one, two and three dimensions. The two simplest ones are presented in four and arbitrary dimensions. Upper limits for the difference between the Euclidean distance and the computed distances have been computed. These results and the generalization of the distances to higher dimensions than two seem to be new.

- (169) FOA Report C30327-E
Transmissionline-transformers, theory and design data
Åke Bergquist

May 1983

The fundamental theory of transmissionline-transformers is presented together with calculated values of the reflexion coefficient of transformers of different variations of impedance.

E1 Reconnaissance, target location and fire control

- (170) FOA Report C20494-E1
Tomographic velocity-estimation for crosshole measurements
Sven Ivansson

(in English)
May 1983

A discussion of uniqueness and confidence for estimated velocities is given on the basis of a well-known linear model from mathematical statistics. An analysis of an earlier proposed iterative tomographic algorithm is also included. In fact the results

from this algorithm can naturally be interpreted in terms of the mentioned linear model. Examples are given from a field-experiment at Kråkemåla in southern Sweden conducted in late 1981.

- (171) FOA Report C30315-E1
 Matching edges in maps and aerial images using the chamfer matching algorithm
 (in English)
 Gunilla Borgefors March 1983

The purpose of matching edges here is to find the same geographical features in two different images. This report investigates an algorithm for matching edges called chamfer matching. The possible applications for this algorithm are, among others, navigation, presentation of multisensor data and precision rectification. Chamfer matching is a fine matching method, which can be used when the position of the edge searched for is roughly known. Both translation and rotation of the edge are considered. The computational examples show that chamfer matching works quite well in many realistic situations.

- (172) FOA Report C30319-E1
 Laser depth sounding for localization of oil below water surface - results from a flight trial
 Ove Steinvall April 1983

Flight trials, initiated by the Swedish Coast Guard, have been performed to study the potential of laser depth sounding for detection of oil below water surface. The oil samples in the form of nets covered with oil could be detected down to 15 m depth. Approximately 1/10 of the laser beam cross-section was occupied by oil. With lower areal coverage the echo from the oil disappears against a background of backscattered laser radiation from the surrounding water volume. By comparing the magnitude of the oil echo with that of the bottom of the corresponding depth an estimate of the detection range for other water clarities could be done. The result is in agreement with that of an earlier feasibility study (FOA Report C30290-E1, August 1982).

- (173) FOA Report C30322-E1,E3
 Aerosol extinction studies in the visible and IR regions
 Bertil Nilsson and Arne Hågård (in English)

An aerosol model, based on Mie theory, which takes varying air humidity into consideration, relates aerosol extinction to meteorological variables. Simultaneous measurements with an automatic weather station and with a transmissometer which operates at 15 different wavelengths from 0.5 to 14.0 μm have been done during long continuous periods since 1977. The analysis of measured data confirm the expected relation between optical transmission and varying air humidity. The data have also been grouped into trajectory sector classes which represent different source areas and transport routes for the different air masses. The aerosol extinction as a function of wavelength shows characteristic differences between the different classes.

A model for calculation of the operational utility of electro-optical systems has been developed. The results from analysis of the extinction in combination with weather data for a 10 year period are used as parameters. Examples of results obtained with the models are presented.

- (174) FOA Report C30324-E1
 Detection and remote sensing of chemical agents (in English)
 P. Helander, I. Renhorn and O. Steinvall May 1983

An opto-acoustic detector has been designed and calibrated against ethylene using different CO₂-laser lines. A responsivity of 150 Vcm/W was measured which compares well with a theoretical response of 220 Vcm/W. The absorption spectrum of the four chemical agents, TMP, DMMP, DDVP and TEP has been obtained at CO₂-laser wavelengths ranging from 9.2 µm to 10.9 µm. The gas-phase absorption maximum around 9.5 µm is observed and compared to spectra obtained by Fourier transform spectroscopy. The applicability of CO₂-laser technique for remote sensing of chemical agents is discussed and the demands on such a system are given. A minimum detectable concentration $C \times L$ down to 50 mg/m² and detection ranges of several kilometres are indicated by those estimates in the absence of interfering gases.

E2 Communications

- (175) FOA Report C30326-E2
 The radiance from an isotropic point source in a multiple scattering medium (in English)
 Kjell Östberg June 1983

Starting from the general solution of the equation of radiative transfer in the small-angle scattering approximation, expressions are derived for the radiance and irradiance from an isotropically radiating point source in a multiple scattering medium. These expressions are exact and comparatively simple to evaluate numerically. Comparisons are made with the corresponding results obtained with an approximate theory.

E3 Guidance, navigation and target identification

- (176) FOA Report C20489-E3
 Report from the International Congress of Navigation in Paris, France,
 21-24 September 1982
 Sylve Arnzén and Erik Skarman (Saab-Scania AB) April 1983

A survey of results and impressions from the International Congress of Navigation in Paris, September 1982, concerning integrated navigation for sea, air and space applications. Navigation of land vehicles was not dealt with explicitly, but the technique used and navigational aids treated are as well useful for land purposes. A summing up in chapter 3 forms a short, total survey of the main results of the Congress and may be read separately, independent of the rest of the more detailed report.

E4 Countermeasures, including signal interception and technical intelligence

- (177) FOA Report C20500-E4
 Protection against heat radiation in the steel industry
 Lars Gustavsson June 1983

In the steel industry there are work places with strong heat radiation, which constitutes a work environment problem. For that reason there is a demand of a visor which protects against heat radiation. In this project a visor has been developed in a prototype which fulfills such demands. Besides high attenuation of heat radiation the visor has a good visual transparency.

The visor has at tests on work places in steel industries been received very well. It has suitable optical properties and is also resistant against scratches and hardly becomes warm. A general desire is that the visor commercially is going to be

manufactured. Besides the steel industry a market exists in other work places with strong heat radiation.

F VEHICULAR TECHNOLOGY

F9 Techniques of material

- (178) FOA Report B20042-F9
 ESCA studies of carbon fibres: Part I - the chemical composition of a carbon fibre subsurface (in English)
 Kjell Waltersson

Courtaulds AS carbon fibres have been studied by the ESCA technique after oxidation treatments in a mixture of H_2SO_4 and HNO_3 to increase the amount of oxygen containing groups on the fibre surface. The elements C, O, N, S, Cl, Na, Ca and Si were observed with the fibre subsurface, and their mole fractions are given. It was possible to distinguish between the contributions to the ESCA spectra originating from the fibre subsurface and the contributions coming from overlayers formed on these fibres after treatments with epoxides or amines. The analysis of the ESCA spectra taken of the epoxy or the amine treated fibres revealed that there exist oxygen and carbon concentration gradients within the fibre subsurface.

Reprint from Fibre Science and Technology, Vol.17, pp 289-302, 1982;
 FOA Reprints 1982/83:9

- (179) FOA Report C20497-F9
 Ballistic impact on carbon fibre reinforced epoxy composites (in English)
 Elise Halloff May 1983

Unloaded carbon fibre epoxy laminates (~2.5 mm) have been impacted with 6 mm and 8 mm spherical projectiles. The impact velocity was in the 70-1300 m/s interval and the impact angle was 30° , 60° or 90° . The results reported are the extent of visible and internal damage, the limit values of impact velocity for penetration, the reduction of velocity (energy) of the projectile after penetration and the energy absorption of the composite.

H HUMAN ENVIRONMENT

H1 Man in field environment

- (180) FOA Report C54046-H1
 Respiratory changes by hyperbaric oxygen
 Carl-Olov Criborn and Christina Henriksson May 1983

Registrations of the respiration on mouse and rat before, during and after the influence of hyperbaric oxygen (4-5 ata O_2) may be used for prediction on imminent convulsion.

The course of events was:

The respiration decreases when the pressure of oxygen increases. Then the respiration increases. Before the convulsions the respiration decreases again.

The protective effect of many earlier tested substances or methods against oxygen induced convulsions depends on their ability to decrease the respiration.

(181) FOA Report C54047-H1

Connections between oxygen induced convulsions and a sound stimulated respiratory response in mouse and rat
 Carl-Olov Criborn and Christine Henriksson

May 1983

The effect of hyperbaric oxygen (4-5 ata O_2) on a sound stimulated respiratory response in mouse and rat shows a reversible course of events. In the beginning of the treatment the response decreased, but later on and before the oxygen induced convulsions the responses increased and sometimes were synchronized with the acoustic tone pulses (8 kHz 12 pulses/min). During this period of sensibility for convulsions it is known that the activity of Δ -waves in the brain is high which has been shown earlier in investigations with EEG on rats. This knowledge may give new ideas for protection of oxygen poisoning.

(182) FOA Report C54048-H1

Physical examination of the back in 999 young men
 Anna-Lisa Hellsing, Bengt Nordgren, Rickard Sch  le, Bj  rn Ahlborg and
 Lennart Paulsson

June 1983

5824 young men (approximate age 18) have answered questions mainly concerning back pain and back weakness. 37% said that they had had back pain at least once during the last 2 years. However, only 1.2% reported back pain that seriously interfered with normal life and only 7.6% had pain that had "some significance on their daily activities".

A subsample consisting of 954 men with and 45 men without back pain during the last two years was submitted to an extensive physical examination, mainly of the back. In addition, force at attempted trunk extension and flexion was assessed, and data from the ordinary medical and psychological examination performed at enrolment for military service was collected. 41% reported pain (including slight pain) during springing test of the lower part of the lumbar spine (L_4 and L_5). Passive outwards rotation of the hip joint exceeded 60° in 39% and passive inwards rotation exceeded 45° in 26%. In the knee joint passive hyperextension of at least 10° was observed in 21%. In straight leg raising only 18% reached 90° with both legs, which shows that short hamstring muscles are very prevalent in this population. The results indicate that current 'normal ranges' are not always applicable to men of 18.

(183) FOA Report C54049-H1

CW-protection and combat efficiency
 Ulf Danielsson

June 1983

This literature study deals with the effects on various military activities when wearing individual protection against chemical warfare (CW). A complete chemical warfare protective gear, *ie* mask, overgarment, gloves and boots, reduces the combat efficiency. The reasons are:

- (i) Heat stress, which will be pronounced in particular if the combat uniform is used beneath the CW-protective gear. In order to prevent heat exhaustion, the time for accomplishing a heavy task must increase 2-6 times compared with the expected time when wearing only the normal combat uniform. The CW-protective overgarment alone will cause a heat stress, which is comparable with that of the ordinary combat uniform.
- (ii) Reduced manual dexterity and mobility due to wearing gloves and boots.
- (iii) Restricted communications (vision and hearing) due to mask design.

(iv) Reduced work capacity due to the air resistance of the protective mask, dehydration, and reduced energy supply.

(184) FOA Report C54051-H1

The importance of 5-hydroxytryptamine (5-HT) in the mediation of an acoustic respiratory response in the rat: a comparison between the effects produced by the inhibitor of 5-HT synthesis *p*-chlorophenylalanine (PCPA) and the putative 5-HT receptor agonist 5-hydroxy-2-(di-*n*-propylamino) tetralin (8-OH-DPAT)
Sven Ahlenius, Carl-Olov Criborn and Christina Henriksson June 1983

In the present experiments we have investigated the effects of PCPA, 5-hydroxytryptophan (5-HTP), 8-OH-DPAT and amphetamine on an acoustic respiratory response in the rat. It was shown that PCPA (0.50 and 100 mg/kg $\times$ 4) as well as 8-OH-DPAT (0-2 mg/kg) suppressed the response. The effects produced by PCPA are 5-HT dependent since the effects were counteracted by the administration of 5-HTP (25 mg/kg) in combination with the peripheral decarboxylase inhibitor benserazide (25 mg/kg). No effects on the acoustic respiratory response were found after administration of 5-HTP (25-100 mg/kg) and benserazide alone. The administration of amphetamine produced a small enhancement of the respiratory response.

Thus, a decrease in central 5-HT appears to produce a suppression of the acoustic respiratory response. Consequently, the ergot congener 8-OH-DPAT does apparently not stimulate central postsynaptic 5-HT receptors involved in the respiratory response. The possibility remains however that 8-OH-DPAT produced its effects via activation of presynaptic 5-HT receptors. A stimulation of central catecholamine receptors by 8-OH-DPAT is not likely since the opposite effect was obtained by the administration of amphetamine, which indirectly activates central catecholamine receptors.

(185) FOA Report C59005-H1

Test of a mini cooker for Swedish Air Force survival kits
Björn Fransson and Christer Spångberg

April 1983

Tests have been completed of a solidified alcoholic jelly in order to investigate the suitability for the Swedish Air Force Survival Kits. The tests were carried out as a comparison between a solidified alcoholic jelly, contained in a simple cooker, and a Meta Cooker with Meta Fuel Tablets.

The results show a very small difference between the alcoholic jelly and the Meta Fuel in heating capacity but the alcoholic jelly has great handling advantages.

(186) KAMEDO Report XLVIII

Catastrophe medical studies: treatment of burns
Gösta Arturson, Bo Brismar and Henry Lorin

H2 Man and technical systems

(187) FOA Report C56037-H2

Ground-to-air estimation of true track of aircraft
Björn Norlin and Gunnel Frenzel-Norlin

April 1983

Eight aircraft-spotters estimated the true track of aircraft. Simple circular devices equipped with a turnable pointed and graded 0-360° were used. A SAAB 105 aircraft flew predetermined routes (altitude 1400 ft, IAS 320 kn) and was tracked by radar. The perpendicular distance from the tracks to the observation point varied between 0 and 5.2 km. The 38 tracks were estimated twice, making a total of 604 observations. No feedback was given throughout the experiment. The estimations average absolute deviation

from actual true track was approximately 10° . The deviation was more than 30° for 20% of the estimations. An analysis of variance indicates a significant effect of perpendicular distance from track to observation point, $p(F) < 0.01$. The same analysis shows interindividual differences to be significant, $p(F) < 0.01$. Comparisons of various aids for true track estimation and studies of the effects of training are suggested.

(188) FOA Report C56038-H2

Terminal work in the process industry - experience in a time perspective.

Part I: the installation phase

Matte Holmgren

May 1983

The results presented in this report concern experience and ideas about a computer based system for control and supervision of a rather complex technical process with a comparatively low level of automation. They are based on interviews and questionnaires collected at three times during 15 months and show a rather stable positive attitude towards the system. Some age differences were present. The computer based system conveyed better availability of information and more information. The operators did not feel as controlled as assumed by visitors. The automatic control systems led to an increased security for the operators. The results suggested the influence of situation-specific factors and emotional components on the attitudes. The variable process feeling seems to be related to the possibilities of controlling the process, which is not solely dependent on the system design.

H3 Man and social systems

(189) FOA Report C55057-H3

Behavioural systems and policy analysis in USA

Bertil Mårdberg

May 1983

The report summarizes a study tour in the US with the purpose of studying behavioural sciences institutes, civil research institutes and university departments of psychology.

The conclusions are:

- cognitive models have great impact on behavioural systems development,
- computers are extensively used in behavioural contributions to studies,
- integrated behavioural models and advanced interdisciplinary approaches are rare.

M INTERDISCIPLINARY STUDIES AND INVESTIGATIONS

M1 Military defence operational analysis

(190) FOA Report C10228-M1

Studies of ground combat at an aggregated level

Sven Ivansson

March 1983

An essential problem in war gaming and force planning work is to find a suitable methodology for assessment of ground combat in studies of warfare at an aggregated level.

In this report a review is first given of how this problem has been handled earlier in Sweden. A description of the current situation is also included.

Thereafter follows a discussion of the Swedish so-called 'score method'. This leads to a proposal for a way to construct building-blocks to be used at the aggregated level.

Finally, a reference list is given with comments concerning earlier works of importance.

M3 Security aspects of environmental studies

(191) FOA Report C10221-M3
 Syria and its future
 Sune Persson

November 1982

This study leads to the conclusion that, for a foreseeable future, Syria will probably be governed by a régime based on the military with the Ba'th Party as the political and ideological instrument of this élite. The foundation of the strong position of the Asad régime is its firm control of the power instruments of the State: defence organization, security agencies, police and administration.

In such a case Syria of the 1980s will probably be characterized by continuing liberalization of its economy, continued trade with the West and import of their technology and continued financial dependence on the oil-exporting Arab countries; a closer foreign policy association with the conservative/moderate Arab states, freeing the country from its geopolitical isolation; military withdrawal from Lebanon; continued cooperation with the Soviet Union, combined with, if possible, closer relations with the West.

- Radical changes in the above principal scenario are possible in the event of
- (a) an Iranian victory in the war against Iraq, followed by an alliance of Syria, Iraq and Iran, or
 - (b) a normalization of Syria's relations with Israel.

The possibility that the Muslim Brotherhood will seize power is considered small. An Islamic republic in Syria would in all probability throw the country into civil war and chaos.

The study is a part of the AIS project.

M5 Defence economy

(192) FOA Report C10226-M5
 The world economy and the east-west conflict: developments during the 1970s
 Erik Moberg

February 1983

During the 1970s, the world economy has undergone considerable change affecting economic relations between different countries and groups of countries. The evolution of the price of oil is a case in point, implying greater purchasing power of oil exporting countries and a heavier burden on the economies of oil importing countries. Simultaneously, economic growth in the industrialized world has stagnated, which is of significance not only to the industrialized countries themselves, but to the entire world economy.

The report analyses how these developments have affected east-west conflict.

T SPECIAL MEASURES FOR LIMITATION AND CONTROL OF ARMAMENTST1 Seismological multiple station

(193) FOA Report C20492-T1
 Seismology, 1982, nuclear test ban verification. Earthquake and earth resource investigation
 Harriet Ohlsson

(in English)
 May 1983

This progress report for 1982 is the third yearly report summarizing the seismological activities of the National Defence Research Institute (FOA) in Sweden. This branch of the Institute is mainly involved in Seismic Discrimination and Nuclear

Explosion Monitoring. Special attention is paid in this report to the development of International Data Centres as a component of a global Monitoring System.

The Institute is also conducting a project on seismic risk estimation at Nuclear Power Plants in Sweden. This project includes operating a network of local seismic stations in Sweden.

Two seismic exploration projects are currently being conducted at the Institute. One project involves the further development of seismic methods for oil exploration, and the other the investigation of crystalline rock using seismic cross hole measurement.

THE SWEDISH BOARD OF PSYCHOLOGICAL DEFENCE PLANNING

- (194) BN Report No.117
Methods of propaganda
Håkan Hvitfelt (University of Gothenburg) April 1983

In this report is presented methods of propaganda of various kinds for influencing attitudes within the fields of political propaganda and advertising. It deals both with linguistic methods and with sociological and psychological methods.

- (195) BN Report No.118
The Uboat threat and Swedish opinion
Kurt Törnqvist June 1983

A presentation of the results of an opinion poll among the Swedish population in May after the publishing of the report by the Uboat Committee, after the Soviet answer to the Swedish note and during the Uboat hunt in the Sundsvall area. Comparisons are made with the results of the opinion poll in Fall 1982 and with the results received in a poll in November 1981, after the incident with the Soviet Uboat that ran aground in the Karlskrona archipelago.

- (196) BN Research Information No.100
Effects of press support
Robert Georg Picard February 1983
(Review by Kurt Törnqvist and Jan Skoglund)

For more than a decade a system of support of the press has been in practice in Sweden in order to prevent the closing down of newspapers and to maintain the plurality of opinion forming and news service. In this piece of information an account is given of studies made by an American scientist concerning the effects of the Swedish system of press support to the newspapers in two towns, Värxjö and Visby.

- (197) BN Research Information No.101
Research information by the Swedish board of psychological defence planning
Kurt Törnqvist and Anna-Karin Edberg

Besides research reports in our serial publication 'Psykologiskt Försvar' the Swedish Board of Psychological Defence Planning also publishes information about research by others in our field of interest. This research information is published in our serial publication 'Meddelanden'. A list of 100 Meddelanden which have been published since 1964, is given in this Meddelande. They are presented in order of publishing, according to areas of topics and according to authors.

- (198) BN Research Information No.102
After Horsefjärden
Class Lundgren (University of Gothenburg) May 1983

Comments by Radio Moscow to the report by the Swedish Uboat Committee in its broadcasts in Swedish during the period 24 April to 17 May are presented in this piece of information. In an appendix quotations from the broadcasts in Swedish by Radio Moscow are given.

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