



BR77860 ✓

UNLIMITED

Trans 2062 ✓

2

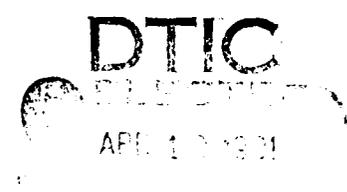


ROYAL AIRCRAFT ESTABLISHMENT

\*

Library Translation 2062

December 1980



AD A097617  
Trans 2062

**SWEDISH DEFENCE RESEARCH  
ABSTRACTS 79/80-4**

by

National Defence Research Institute, Stockholm

\*

Procurement Executive, Ministry of Defence  
Farnborough, Hants

DTIC FILE COPY

UNLIMITED 81 4 09 127

BR77860 ✓

UNLIMITED

Trans 2062 ✓

2

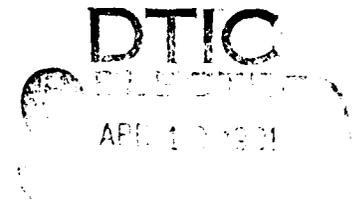


ROYAL AIRCRAFT ESTABLISHMENT

\*

Library Translation 2062

December 1980



AD A 097 617  
Trans 2062

**SWEDISH DEFENCE RESEARCH  
ABSTRACTS 79/80-4**

by

National Defence Research Institute, Stockholm

\*

Procurement Executive, Ministry of Defence  
Farnborough, Hants

DTIC FILE COPY

UNLIMITED 81 4 09 127

Translations in this series are available  
from:

THE R.A.E. LIBRARY  
Q.4 BUILDING  
R.A.E. FARNBOROUGH  
HANTS

New translations are announced monthly in:

"LIST OF R.A.E. TECHNICAL REPORTS,  
TRANSLATIONS and BIBLIOGRAPHIES"

Translations in this series are available  
from:

THE R.A.E. LIBRARY  
Q.4 BUILDING  
R.A.E. FARNBOROUGH  
HANTS

New translations are announced monthly in:

"LIST OF R.A.E. TECHNICAL REPORTS,  
TRANSLATIONS and BIBLIOGRAPHIES"





Index to FRÖ 79/80-4

- A        PROTECTION - ATOMIC
- A3        Effects of nuclear explosions, and protective measures
- (160)     Simulating the early fire growth in residential rooms
- (161)     Scalar law for flashover in a residential room
- (162)     Dominant and recessive effects of induced lethals in female mice by exposure to gamma-irradiation during the 10th to 14th day of intrauterine life
- B        PROTECTION - BIOLOGICAL
- B2        Protective measures
- (163)     Morphological and chemical characteristics of a *Cytophaga* sp. grown under conditions of magnesium excess and magnesium limitation
- B3        Injuries and treatment - biological
- (164)     Quantification of immunological reactions by luminescence
- C        PROTECTION - CHEMICAL
- C1        Threat scenario
- (165)     Cardiac puncture in the mouse through the anterior thoracic aperture
- D        AMMUNITION AND WEAPON TECHNOLOGY
- (166)     Explosive accident at Tagene, Göteborg, 21 June 1976. Damage at a distance
- D1        Technology of explosives
- (167)     Experience in the manufacture of propellant for base-flux charges for the 105mm shell M40/74
- (168)     Plastic-bonded explosive. I    A review of the literature
- D4        Technical aspects of warheads
- (169)     Impact-ballistic investigation of light automatic carbines FNC and FFV 890 using FFV 890 ammunition (development version)
- D8        System studies
- (170)     Programmer's manual for the *MENU DIALOGUE SYSTEM* program package
- (171)     Test of a position-finding system based on HI-FIX/6
- E        CONDUCT OF WAR - INFORMATION AND COMMAND TECHNIQUES
- E1        Reconnaissance, target location and fire control
- (172)     Meteorological influence on aerosol extinction in the 0.2 to 40.0um wavelength range
- (173)     A data structure for a raster map data base
- (174)     Noise and leakage signals in microwave frequency mixers for Doppler radars
- (175)     Investigations of the meteorological influence on aerosol transmission in the 0.5 to 14.0um wavelength range
- (176)     Underwater communication. FOA-STU project 4 - marine engineering
- (177)     Optical aids to navigation in Arctic waters. Field trials on a voyage to Marmorilik in Greenland
- (178)     *FIXLIE* on PDP-11/34: Systems documentation. A user-oriented tool for layered imagery handling
- (179)     A survey of sporadic E layer, its occurrence and cause

- E2        Communications
- (180)     Data obtained in radiowave propagation experiments on the path Kiruna-Stockholm
- E3        Guidance, navigation and target identification
- (181)     *CONDIS* - a development of the simulation package *COMBINEDSIMULATION*
- (182)     Positional errors in hydroacoustic navigation
- (183)     The laser radar equation
- (184)     'Electronic warfare systems and technology', Conference held in Washington, March 1980
- F         VEHICULAR AND SPACECRAFT TECHNOLOGY
- F9        Materials
- (185)     Effect of humidity and temperature on carbon-fibre epoxy composites
- H         HUMAN ENVIRONMENT
- H1        Investigations, future projections
- (186)     Exemption from military service on psychiatric grounds - some consequences for personal perception
- (187)     Manpower wastage from military service - analysis and summary of a current behavioural study and results of research
- (188)     Theoretical analyses of certain problems in predictive science
- H3        Environmental extremes
- (189)     Biochemical effects altering seizure mechanisms of acute oxygen poisoning
- H6        Individual and group efficiency
- (190)     Vegetable extract as a protection against disease-bearing insects
- (191)     Changes in lipoprotein-lipase activity and lipid stores in human skeletal muscle with prolonged heavy exercise
- (192)     EMG frequency spectrum, muscle structure and fatigue during dynamic contractions in man
- (193)     Physical efficiency. Short-term information requirements of the National Service Department
- H9        Man and machine systems
- (194)     Real-time simulation on a landscape model. I    General description
- (195)     Functional study of diving gauntlets
- M         INTERDISCIPLINARY STUDIES AND INVESTIGATIONS
- M6        Information systems
- (196)     *VIEWDATA* interface for arbitrary computer programs
- (197)     When does office automation succeed? Report on a symposium
- T         CERTAIN MEASURES FOR LIMITATION AND CONTROL OF ARMAMENTS
- T1        Seismological multiple stations
- (198)     Internal seismological stations for monitoring a comprehensive test ban treaty
- T3        Scientific documentation
- (199)     Disarmament and development. A bibliographical guide to UN studies
- (200)     Accelerator breeders - experience gained on a visit to the USA in autumn 1979

- X        MISCELLANEOUS (In-house projects etc)
- (201)    Successful projects. Some specimen types of project
  - (202)    The future of defence research
  - (203)    Radio Malmöhus and the snowstorm
  - (204)    Attitudes to defence and confidence in the future
  - (205)    Psychological warfare up to the 1990s
  - (206)    Research for the Emergency Council
  - (207)    Attitudes to international relations and defence
  - (208)    Credibility and confidence, reliability and reliance
  - (209)    A re-assessment of public opinion
  - (210)    The agenda function and the theory of mass communication
  - (211)    Propaganda, information and the mass media

- X        MISCELLANEOUS (In-house projects etc)
- (201)    Successful projects. Some specimen types of project
  - (202)    The future of defence research
  - (203)    Radio Malmöhus and the snowstorm
  - (204)    Attitudes to defence and confidence in the future
  - (205)    Psychological warfare up to the 1990s
  - (206)    Research for the Emergency Council
  - (207)    Attitudes to international relations and defence
  - (208)    Credibility and confidence, reliability and reliance
  - (209)    A re-assessment of public opinion
  - (210)    The agenda function and the theory of mass communication
  - (211)    Propaganda, information and the mass media

No dominant mutations were observed, nor any dominance effect from the induced recessive lethal equivalents. The risks of radiation during intrauterine development are discussed.

B PROTECTION - BIOLOGICAL

B2 Protective measures

- (163) FOA Report B 40113-B2  
Morphological and chemical characteristics of a *Cytophaga* sp. grown under conditions of magnesium excess and magnesium limitation (in English)  
Åke Bovallius July 1980

A cytophage bacterium, when grown under conditions of  $M_S^{2+}$  limitation, produces a factor which releases cholinesterase from plaice muscle. A period in which rapid production of this factor occurs begins soon after the start of magnesium limitation. Modifications to the morphology, ATP content and the coarse chemical composition of the bacteria also occur during this period. The content of protein and carbohydrate increases by respectively 60% and 100%, while that of RNA and ATP decrease to respectively 70% and 40%. An increased quantity of carbohydrate is found extra-cellularly under these conditions of culture, and it can be at least partly correlated in time with the occurrence of extra-cellular mucus, which was observed under the electron microscope.

B3 Injuries and treatment - biological

- (164) FOA Report B 40112-B3  
Quantification of immunological reactions by luminescence (in English)  
T. Olsson and others June 1980

Immune reactions can be quantified by luminescence analysis if one of the reacting components is active in a luminescence reaction. In a model system a commercial conjugate, based on horseradish (*Armoracia*) peroxidase bound to goat anti-rabbit immunoglobulin G, was used to quantify the antibodies and antigens in what is termed a solid-phase immunoassay. Protohaemin, as found in the peroxidase molecule, catalyses the light-emitting luminol reaction. Rabbit antibodies directed against serum albumin, and also serum albumin as such, could be measured in this system, using the peroxidase-catalysed luminol reaction, with a sensitivity comparable with that obtained in conventional systems based on measurements of enzyme activity in an antibody-enzyme conjugate. Luminescence analysis was also found to have a wider measuring interval and better reproducibility from one day to the next.

Attempts were also made to couple firefly luciferase with immuno-active antibodies purified from sheep serum by various coupling methods, and the products thus obtained were characterised partly with respect to their luminescent and immunological activity.

The model studies indicate that luminescence measurements of immunological reactions might be developed into sensitive and precise methods of immunological analysis.

No dominant mutations were observed, nor any dominance effect from the induced recessive lethal equivalents. The risks of radiation during intrauterine development are discussed.

B PROTECTION - BIOLOGICAL

B2 Protective measures

- (163) FOA Report B 40113-B2  
Morphological and chemical characteristics of a *Cytophaga* sp. grown under conditions of magnesium excess and magnesium limitation (in English)  
Åke Bovallius July 1980

A cytophage bacterium, when grown under conditions of  $M_S^{2+}$  limitation, produces a factor which releases cholinesterase from plaice muscle. A period in which rapid production of this factor occurs begins soon after the start of magnesium limitation. Modifications to the morphology, ATP content and the coarse chemical composition of the bacteria also occur during this period. The content of protein and carbohydrate increases by respectively 60% and 100%, while that of RNA and ATP decrease to respectively 70% and 40%. An increased quantity of carbohydrate is found extra-cellularly under these conditions of culture, and it can be at least partly correlated in time with the occurrence of extra-cellular mucus, which was observed under the electron microscope.

B3 Injuries and treatment - biological

- (164) FOA Report B 40112-B3  
Quantification of immunological reactions by luminescence (in English)  
T. Olsson and others June 1980

Immune reactions can be quantified by luminescence analysis if one of the reacting components is active in a luminescence reaction. In a model system a commercial conjugate, based on horseradish (*Armoracia*) peroxidase bound to goat anti-rabbit immunoglobulin G, was used to quantify the antibodies and antigens in what is termed a solid-phase immunoassay. Protohaemin, as found in the peroxidase molecule, catalyses the light-emitting luminol reaction. Rabbit antibodies directed against serum albumin, and also serum albumin as such, could be measured in this system, using the peroxidase-catalysed luminol reaction, with a sensitivity comparable with that obtained in conventional systems based on measurements of enzyme activity in an antibody-enzyme conjugate. Luminescence analysis was also found to have a wider measuring interval and better reproducibility from one day to the next.

Attempts were also made to couple firefly luciferase with immuno-active antibodies purified from sheep serum by various coupling methods, and the products thus obtained were characterised partly with respect to their luminescent and immunological activity.

The model studies indicate that luminescence measurements of immunological reactions might be developed into sensitive and precise methods of immunological analysis.

C PROTECTION - CHEMICALC1 Threat scenario

(165) FOA Report B 40107-C1

Cardiac puncture in the mouse through the anterior thoracic aperture

(in English)

Lars Frankenberg

May 1980

The puncture is made under anaesthesia by ether, and usually yields 0.6 to 0.8 ml of blood during 10-15 s. Blood volumes of up to 1 ml have been obtained on several occasions from adult mice by this method.

A number of different methods have been described for taking blood samples from mice: puncture of the orbital plexus (Stone, 1945); amputation of the tail and suction of the blood (Ambrus *et al.*, 1951); dissection and incision of arteria femoralis, arteria carotis or vena jugularis (Ambrus *et al.*, 1951); dissection and incision of the abdominal aorta (Eric, 1964) as previously described for the rat (Lushbough and Moline, 1961) and cardiac puncture through the thoracic wall. Cardiac puncture is a good method when it is required to obtain rapidly a large volume of blood, as in studying the distribution of various substances. The present article describes a new and more reliable method of cardiac puncture in the mouse, the cannula being introduced through the anterior thoracic aperture.

Offprint from *Laboratoris Animalis* (1979), 13, 311-312.

D ACCIDENTS AND WEAPON TECHNOLOGY

(166) CTH-A-BB 1979:8

Explosive accident at Tagene, Göteborg, 21 June 1976. Damage at a distance Karl Wallin

On 21 June 1976 a serious explosive accident took place 8 km NNE of the centre of Göteborg, on the Hisingen at the AB Sabena macadam works in Tagene. During loading from two storage containers, 8.5 tons of explosive detonated causing serious results in the near vicinity, with two killed, one missing and five injured. Also damaged were motor vehicles, machinery, sheds and the bark was stripped from the nearby wood.

At the instance of the Defence Research Institute the Department of House-building at the CTH studied and analysed the damage inflicted at a distance after the accident. Damage to buildings was caused as far as 6 km from the site of the incident.

The built-up area nearest to the site of the incident is an industrial estate. Here extensive damage was caused to exterior-frame walls, gates, windows and exterior wall cladding. Serious damage was also caused to buildings in a district (Södra Kärra) 1-2 km north of the explosion. In Norra Kärra and Hjällbo 2-3 km from the explosion there was widespread breakage of glass. Besides window glass, the lighter sections of buildings were damaged in an industrial area east of Kungälvsleden. Fairly extensive glass breakage occurred in the areas of Agnesberg, Hammarkullen and Kortedala, lying within a 4 km radius of the explosion centre.

The report discusses 335 cases of damage due to the incident, which represent somewhat more than half of the damage recorded by the insurance companies. Their overall

C PROTECTION - CHEMICALC1 Threat scenario

(165) FOA Report B 40107-C1

Cardiac puncture in the mouse through the anterior thoracic aperture

(in English)

Lars Frankenberg

May 1980

The puncture is made under anaesthesia by ether, and usually yields 0.6 to 0.8 ml of blood during 10-15 s. Blood volumes of up to 1 ml have been obtained on several occasions from adult mice by this method.

A number of different methods have been described for taking blood samples from mice: puncture of the orbital plexus (Stone, 1945); amputation of the tail and suction of the blood (Ambrus *et al.*, 1951); dissection and incision of arteria femoralis, arteria carotis or vena jugularis (Ambrus *et al.*, 1951); dissection and incision of the abdominal aorta (Trice, 1964) as previously described for the rat (Lushbough and Moline, 1961) and cardiac puncture through the thoracic wall. Cardiac puncture is a good method when it is required to obtain rapidly a large volume of blood, as in studying the distribution of various substances. The present article describes a new and more reliable method of cardiac puncture in the mouse, the cannula being introduced through the anterior thoracic aperture.

Offprint from *Laboratoris Animalis* (1979), 13, 311-312.

D ACCIDENTS AND WEAPON TECHNOLOGY

(166) CTH-A-BB 1979:8

Explosive accident at Tagene, Göteborg, 21 June 1976. Damage at a distance Karl Wallin

On 21 June 1976 a serious explosive accident took place 8 km NNE of the centre of Göteborg, on the Hisingen at the AB Sabama macadam works in Tagene. During loading from two storage containers, 8.5 tons of explosive detonated causing serious results in the near vicinity, with two killed, one missing and five injured. Also damaged were motor vehicles, machinery, sheds and the bark was stripped from the nearby wood.

At the instance of the Defence Research Institute the Department of House-building at the CTH studied and analysed the damage inflicted at a distance after the accident. Damage to buildings was caused as far as 6 km from the site of the incident.

The built-up area nearest to the site of the incident is an industrial estate. Here extensive damage was caused to exterior-frame walls, gates, windows and exterior wall cladding. Serious damage was also caused to buildings in a district (Södra Kärra) 1-2 km north of the explosion. In Norra Kärra and Hjällbo 2-3 km from the explosion there was widespread breakage of glass. Besides window glass, the lighter sections of buildings were damaged in an industrial area east of Kungälvsleden. Fairly extensive glass breakage occurred in the areas of Agnesberg, Hammarkullen and Kortedala, lying within a 4 km radius of the explosion centre.

The report discusses 335 cases of damage due to the incident, which represent somewhat more than half of the damage recorded by the insurance companies. Their overall

cost amounts to about 8M kronor. The extent of the damage with respect to the number of dwellings in different directions is not uniform. The reason is largely meteorological.

It appears from the report that it would be desirable to direct and thereby control an explosion in safe directions, and to vary the shielding distance.

To sum up, the report gives a broad perspective of the problems which may arise in an incident of this type.

D1 Technology of explosives

- (167) FOA Report C 20350-D1  
Experience in the manufacture of propellant for base-flux charges for the 105mm shell M 40/74  
Torsten Liljegren April 1980

At the instance of the FFV, the FOA has manufactured propellant for base-flux charges for the 105mm shell M 40/74. This was a HTPB propellant containing 80% of ammonium perchlorate. An account is given of the composition, strength properties of the propellant, and of experience gained in its manufacture.

- (168) FOA Report C 20360-D1  
Plastic-bonded explosive. I A review of the literature  
Hugo Berg June 1980

An account is given, derived from published references, of methods of manufacture, composition, testing and applications of various types of plastic-bonded explosive.

D4 Technical aspects of warheads

- (169) FOA Report C 20356-D4  
Impact-ballistic investigation of light automatic carbines FNC and FFV 890 using FFV 890 ammunition (development version)  
Bo Janzon May 1980

The report contains a brief impact-ballistic investigation of a development version of FFV 890 ammunition manufactured by the FFV.

Tests were performed at a true range of 100 m by firing at targets of soap intended to simulate human tissue, measuring 200 × 200 × 270 mm. The penetration pattern was recorded by a stereoscopic arrangement incorporating eleven X-ray flash tubes.

Results show a pronounced difference between the performance of the ammunition when fired from the two different weapons. However the difference can be accounted for by differences in the calibre of the barrels of each weapon, amounting to 0.02 mm. This was chiefly important for the external ballistic performance of the projectiles, which in turn governed their final ballistics.

The results are compared with the Ak 4 using sk ptr 10 prj ammunition.

The experiments were conducted at the instance of FMV-A.

D8 System studies

- (170) FOA Report C 20351-D8  
Programmer's manual for the *MENU DIALOGUE SYSTEM* program package  
Lars-Åke Larsson April 1980

The way in which the dialogue between a computer and a human is designed is of great importance for the extent to which an inexperienced computer user succeeds in handling large and complicated programs from a data terminal. In such situations the

cost amounts to about 8M kronor. The extent of the damage with respect to the number of dwellings in different directions is not uniform. The reason is largely meteorological.

It appears from the report that it would be desirable to direct and thereby control an explosion in safe directions, and to vary the shielding distance.

To sum up, the report gives a broad perspective of the problems which may arise in an incident of this type.

D1 Technology of explosives

- (167) FOA Report C 20350-D1  
Experience in the manufacture of propellant for base-flux charges for the 105mm shell M 40/74  
Torsten Liljegren April 1980

At the instance of the FFV, the FOA has manufactured propellant for base-flux charges for the 105mm shell M 40/74. This was a HTPB propellant containing 80% of ammonium perchlorate. An account is given of the composition, strength properties of the propellant, and of experience gained in its manufacture.

- (168) FOA Report C 20360-D1  
Plastic-bonded explosive. I A review of the literature  
Hugo Berg June 1980

An account is given, derived from published references, of methods of manufacture, composition, testing and applications of various types of plastic-bonded explosive.

D4 Technical aspects of warheads

- (169) FOA Report C 20356-D4  
Impact-ballistic investigation of light automatic carbines FNC and FFV 890 using FFV 890 ammunition (development version)  
Bo Janzon May 1980

The report contains a brief impact-ballistic investigation of a development version of FFV 890 ammunition manufactured by the FFV.

Tests were performed at a true range of 100 m by firing at targets of soap intended to simulate human tissue, measuring 200 × 200 × 270 mm. The penetration pattern was recorded by a stereoscopic arrangement incorporating eleven X-ray flash tubes.

Results show a pronounced difference between the performance of the ammunition when fired from the two different weapons. However the difference can be accounted for by differences in the calibre of the barrels of each weapon, amounting to 0.02 mm. This was chiefly important for the external ballistic performance of the projectiles, which in turn governed their final ballistics.

The results are compared with the Ak 4 using sk ptr 10 prj ammunition.

The experiments were conducted at the instance of FMV-A.

D8 System studies

- (170) FOA Report C 20351-D8  
Programmer's manual for the *MENU DIALOGUE SYSTEM* program package  
Lars-Åke Larsson April 1980

The way in which the dialogue between a computer and a human is designed is of great importance for the extent to which an inexperienced computer user succeeds in handling large and complicated programs from a data terminal. In such situations the

computer should be capable of displaying alternative-choice questions, and also where necessary of printing-out auxiliary texts which explain various questions with which the user may be faced. It is also important for the dialogue to be capable of being adapted to meet the requirements of a more experienced user.

The *MENU DIALOGUE SYSTEM* is a general program package for handling menu dialogues and auxiliary texts. As a rule it can be combined with any application program written in the KOM programming language. The *MENU DIALOGUE SYSTEM* supports menu-handling, interpretation of commands and the handling of auxiliary texts. The design of the dialogue is adapted to the form employed in the KOM conference system.

A demonstration program is available on the DEC-10 system at the Stockholm Computer Centre (S3). The program can be started with the command `..DE FORTMEDI`.

The *FIX-FINDING SYSTEM* is based on dialogue routines from the *HI-FIX* system, developed for the needs of the Defence departments for computer support in budgeting activities.

(171) FOA Report C 20359-D8, (E2, E3)  
Test of a position-finding system based on HI-FIX/6  
Sven Medig

June 1980

As part of a procurement process for position-finding equipment, FOA has conducted trials with a prototype system assembled mainly by Decca Survey Ltd and based on the Decca HI-FIX/6 system.

Position-finding was performed partly on about 20 short sections of road in order to determine the effect of some possible sources of interference such as hills, woods, lakes, power lines, buildings or other vehicles, and partly over three long sections of road in order to discover the effect of external interference, eg through static interference. These determinations were compared with plots made with a geodimeter or from aerial photographs (final result).

Analysis of the results shows that positional error for the possible sources of interference (apart from power lines) was acceptable: level ground 5 m, broken ground 15 m. Neither woodland nor vehicles affected the fixes.

Another type of error is what is termed lane-jumping, which means one or more short errors in position. Lane-jumping occurred when passing under overhead power lines, though not always. According to Decca, errors due to lane-jumping can be automatically corrected in the HI-FIX/6 system. However this function was not employed in the tests. In advance of a demonstration of this function a proposal for procurement cannot be submitted.

E CONDUCT OF WAR - INFORMATION AND COMMAND TECHNIQUES

E1 Reconnaissance, target location and fire control

(172) FOA Report B 30035-E1, E3  
Meteorological influence on aerosol extinction in the 0.2 to 40.0µm wave-  
length range (in English)  
Bertil Nilsson

computer should be capable of displaying alternative-choice questions, and also where necessary of printing-out auxiliary texts which explain various questions with which the user may be faced. It is also important for the dialogue to be capable of being adapted to meet the requirements of a more experienced user.

The *MENU DIALOGUE SYSTEM* is a general program package for handling menu dialogues and auxiliary texts. As a rule it can be combined with any application program written in the KOM programming language. The *MENU DIALOGUE SYSTEM* supports menu-handling, interpretation of commands and the handling of auxiliary texts. The design of the dialogue is adapted to the form employed in the KOM conference system.

A demonstration program is available on the DEC-10 system at the Stockholm Computer Centre (S3). The program can be started with the command `./DEMO.DIALOGUE`.

The *DECCA HI-FIX/6 SYSTEM* is based on dialogue routines from the *HI-FIX* system, developed for the needs of the Defence departments for computer support in budgeting activities.

(171) FOA Report C 20359-D8, (E2, E3)  
Test of a position-finding system based on HI-FIX/6  
Sven Medig

June 1980

As part of a procurement process for position-finding equipment, FOA has conducted trials with a prototype system assembled mainly by Decca Survey Ltd and based on the Decca HI-FIX/6 system.

Position-finding was performed partly on about 20 short sections of road in order to determine the effect of some possible sources of interference such as hills, woods, lakes, power lines, buildings or other vehicles, and partly over three long sections of road in order to discover the effect of external interference, eg through static interference. These determinations were compared with plots made with a geodimeter or from aerial photographs (final result).

Analysis of the results shows that positional error for the possible sources of interference (apart from power lines) was acceptable: level ground 5 m, broken ground 15 m. Neither woodland nor vehicles affected the fixes.

Another type of error is what is termed lane-jumping, which means one or more short errors in position. Lane-jumping occurred when passing under overhead power lines, though not always. According to Decca, errors due to lane-jumping can be automatically corrected in the HI-FIX/6 system. However this function was not employed in the tests. In advance of a demonstration of this function a proposal for procurement cannot be submitted.

E CONDUCT OF WAR - INFORMATION AND COMMAND TECHNIQUES

E1 Reconnaissance, target location and fire control

(172) FOA Report B 30035-E1, E3  
Meteorological influence on aerosol extinction in the 0.2 to 40.0µm wave-  
length range (in English)  
Bertil Nilsson

Aerosol extinction under different weather situations was calculated by Mie theory, using an aerosol model based on dry particles. The size distribution of particles and their refractive index were matched to the actual atmospheric humidity by means of a build-up factor  $r/r_0$ , which is a function of relative humidity.

The report shows that particle concentration in different size ranges has a dominant effect on the relation between aerosol transmission in the IR band and meteorological visibility. Variations in atmospheric humidity affect aerosol extinction for the most part through modification of the size distribution, and to a lesser extent by variation of the refractive index.

FOA Reprints 1979/80:19.

- (173) FOA Report B 30036-E1  
A data structure for a raster map database (in English)  
Roger L.L. Cedarberg

An increasing demand for geographical information in the public, private and military sectors has stimulated progress with regard to the automatic collection, storage, analysis and display of geographical databases. A large part of the costs of these systems can be attributed to the digitalisation and coding of the input data. A method is suggested for the storage of binary original data. This method affords high storage efficiency, and data can be accessed in both the raster and vector modes.

Delivered at the Fourth International Symposium on Computer-assisted Cartography, 4-8 November 1979, Reston, Virginia, USA.

FOA Reprints 1979/80:23.

- (174) FOA Report C 30181-E1  
Noise and leakage signals in microwave frequency mixers for Doppler radars  
Herbert Steyskal February 1980

The report describes a simple mathematical method for obtaining quantitative expressions for the amplitudes of the principal IF products which occur when several signals are mixed in a microwave frequency mixer. It is assumed that both the local oscillators and the interference signals generate noise. The method of calculation is applied to several examples, including simple and balanced mixers with square-law or linear detectors.

- (175) FOA Report C 30182-E1, E3  
Investigations of the meteorological influence on aerosol transmission in the  
0.5 to 14.0 $\mu$ m wavelength range (in English)  
Arne Hågård *et al* April 1980

Aerosol extinction is calculated in a theoretical model based on Mie theory and proceeding from the size distribution and refractive index of the aerosol particles, these in turn being related to the meteorological parameters such as the type of air mass, humidity and meteorological visibility. Calculations with the model demonstrate that there is a pronounced influence of the weather on aerosol extinction as a function of wavelength. In order to verify and modify the model, measurements were made with a transmissometer over a horizontal measuring path. The equipment was in operation for 15 months, automatically recording every 10th minute both the atmospheric attenuation in 15 bands in the 0.5 to 14.0 $\mu$ m range and the measurements taken from a number of

Aerosol extinction under different weather situations was calculated by Mie theory, using an aerosol model based on dry particles. The size distribution of particles and their refractive index were matched to the actual atmospheric humidity by means of a build-up factor  $r/r_0$ , which is a function of relative humidity.

The report shows that particle concentration in different size ranges has a dominant effect on the relation between aerosol transmission in the IR band and meteorological visibility. Variations in atmospheric humidity affect aerosol extinction for the most part through modification of the size distribution, and to a lesser extent by variation of the refractive index.

FOA Reprints 1979/80:19.

- (173) FOA Report B 30036-E1  
A data structure for a raster map database (in English)  
Roger L.L. Cedarberg

An increasing demand for geographical information in the public, private and military sectors has stimulated progress with regard to the automatic collection, storage, analysis and display of geographical databases. A large part of the costs of these systems can be attributed to the digitalisation and coding of the input data. A method is suggested for the storage of binary original data. This method affords high storage efficiency, and data can be accessed in both the raster and vector modes.

Delivered at the Fourth International Symposium on Computer-assisted Cartography, 4-8 November 1979, Reston, Virginia, USA.

FOA Reprints 1979/80:23.

- (174) FOA Report C 30181-E1  
Noise and leakage signals in microwave frequency mixers for Doppler radars  
Herbert Steyskal February 1980

The report describes a simple mathematical method for obtaining quantitative expressions for the amplitudes of the principal IF products which occur when several signals are mixed in a microwave frequency mixer. It is assumed that both the local oscillators and the interference signals generate noise. The method of calculation is applied to several examples, including simple and balanced mixers with square-law or linear detectors.

- (175) FOA Report C 30182-E1, E3  
Investigations of the meteorological influence on aerosol transmission in the  
0.5 to 14.0 $\mu$ m wavelength range (in English)  
Arne Högård *et al* April 1980

Aerosol extinction is calculated in a theoretical model based on Mie theory and proceeding from the size distribution and refractive index of the aerosol particles, these in turn being related to the meteorological parameters such as the type of air mass, humidity and meteorological visibility. Calculations with the model demonstrate that there is a pronounced influence of the weather on aerosol extinction as a function of wavelength. In order to verify and modify the model, measurements were made with a transmissometer over a horizontal measuring path. The equipment was in operation for 15 months, automatically recording every 10th minute both the atmospheric attenuation in 15 bands in the 0.5 to 14.0 $\mu$ m range and the measurements taken from a number of

meteorological sensors. Aerosol extinction was obtained by subtracting the water vapour extinction, as calculated from measured meteorological data by the *LOWTRAN* program, from the measured values for extinction.

Analysis of the experimental data exhibits a distinct diurnal variation in aerosol extinction, mainly related to variations in relative humidity. Over a longer period the influence due to varying particle concentration in air masses of different origins becomes distinctly noticeable. The measurements also show characteristic differences between different air masses or atmospheric trajectories as functions of wavelength and humidity, in agreement with theoretical model calculations.

- (176) FOA Report C 30185-E1, E2, E3  
Underwater communication. FOA-STU project 4 - Marine engineering  
Lars Götherström *et al* April 1980

The report summarises the technical conditions for underwater communication by acoustic, optical and radio systems. The performance is assessed for different methods of transmission and for different assumptions as to the water environment. In the context of technical possibilities, for the communication requirements in various systems for underwater applications and their practical feasibility, a number of projects are recommended for development.

- (177) FOA Report C 30190-E1  
Optical aids to navigation in Arctic waters. Field trials on a voyage to Marmorilik in Greenland  
Mats Eriksson and Hans P. Palenius April 1980

The Institute of Optical Techniques of FOA 3 was represented by Mats Eriksson on a voyage in MV Thuleland from England to the mining township of Marmorilik in Greenland. The object was to test optical instruments which had been previously tested as navigational aids.

The field trial, which should be regarded as a preliminary study, showed among other things that the use of image intensifiers makes it possible to detect and identify icebergs under the darkest conditions of illumination considerably earlier than when using the traditional binoculars.

- (178) FOA Report C 30191-E1  
*PIXLIB* on PDP-11/34: Systems documentation. A user-oriented tool for layered imagery handling (in English)  
S. Ingvar Åkerston April 1980

This is a documentation of the *PIXLIB* library of subroutines, developed for the interactive processing of multi-layered image data on the PDP-11/34 computer in FOA 820.

The reporting date is 25 April 1980 and correction, amendment or addition included later will be included in the continuously updated and complete documentation which is available from the *PIXLIB* source code archive in FOA 820

- (179) FOA Report C 30192-E1  
A survey of sporadic E layer, its occurrence and cause  
Mats Bröms May 1980

This Report is a compilation of selected information on the sporadic E layer ( $E_s$ ). It is meant as an introduction to an investigation of the effect of  $E_s$  on SW communication systems.

meteorological sensors. Aerosol extinction was obtained by subtracting the water vapour extinction, as calculated from measured meteorological data by the *LOWTRAN* program, from the measured values for extinction.

Analysis of the experimental data exhibits a distinct diurnal variation in aerosol extinction, mainly related to variations in relative humidity. Over a longer period the influence due to varying particle concentration in air masses of different origins becomes distinctly noticeable. The measurements also show characteristic differences between different air masses or atmospheric trajectories as functions of wavelength and humidity, in agreement with theoretical model calculations.

- (176) FOA Report C 30185-E1, E2, E3  
Underwater communication. FOA-STU project 4 - Marine engineering  
Lars Götherström *et al* April 1980

The report summarises the technical conditions for underwater communication by acoustic, optical and radio systems. The performance is assessed for different methods of transmission and for different assumptions as to the water environment. In the context of technical possibilities, for the communication requirements in various systems for underwater applications and their practical feasibility, a number of projects are recommended for development.

- (177) FOA Report C 30190-E1  
Optical aids to navigation in Arctic waters. Field trials on a voyage to Marmorilik in Greenland  
Mats Eriksson and Hans P. Palenius April 1980

The Institute of Optical Techniques of FOA 3 was represented by Mats Eriksson on a voyage in MV Thuleland from England to the mining township of Marmorilik in Greenland. The object was to test optical instruments which had been previously tested as navigational aids.

The field trial, which should be regarded as a preliminary study, showed among other things that the use of image intensifiers makes it possible to detect and identify icebergs under the darkest conditions of illumination considerably earlier than when using the traditional binoculars.

- (178) FOA Report C 30191-E1  
*PIXLIB* on PDP-11/34: Systems documentation. A user-oriented tool for layered imagery handling (in English)  
S. Ingvar Åkerston April 1980

This is a documentation of the *PIXLIB* library of subroutines, developed for the interactive processing of multi-layered image data on the PDP-11/34 computer in FOA 820.

The reporting date is 25 April 1980 and correction, amendment or addition included later will be included in the continuously updated and complete documentation which is available from the *PIXLIB* source code archive in FOA 820

- (179) FOA Report C 30192-E1  
A survey of sporadic E layer, its occurrence and cause  
Mats Bröms May 1980

This Report is a compilation of selected information on the sporadic E layer ( $E_s$ ). It is meant as an introduction to an investigation of the effect of  $E_s$  on SW communication systems.

E2 Communications

- (180) FOA Report C 30187-E2  
 Data obtained in radiowave propagation experiments on the path Kiruna-Stockholm  
 (in English)  
 Mats Bröms and others May 1980

The report gives an account of information obtained from experiments in radio wave propagation in the short-wave band over the Kiruna-Stockholm measuring path, with a brief description of the equipment.

See also (171) and (176).

E3 Guidance, navigation and target identification

- (181) FOA Report C 20357-E3  
*CONDIS* - a development of the simulation package *COMBINEDSIMULATION*  
 Lennart Månsson May 1980

This Report describes some developments of the simulation package *COMBINEDSIMULATION* (Keld Helsgaun, Roskilde University, Denmark).

*COMBINEDSIMULATION* is a Simula-class intended for simulation of dynamic systems in an environment with discontinuous variations of equations of state and differential equations. This class also contains facilities for solving ordinary differential equations by means of numerical integration. The discontinuous variations of state and differential equations can be planned using normal concepts from *SIMULATION*, which means that complicated event-controlled simulations can be performed.

The main section of the research has resulted in a Simula class designated *CONDIS*.

*CONDIS* is intended for use on the DEC-10 system at the Stockholm Computer Centre QZ, and employs some of its library routines.

*CONDIS* differs from *COMBINEDSIMULATION* chiefly in two respects. Firstly a new alternative integration method has been introduced, which is a 4th-order predictor-corrector method with detection of discontinuities, and secondly *CONDIS* incorporates a facility by which, after the program has detected certain errors, it can study and vary the parameters in order if possible to be able to resume operation.

- (182) FOA Report C 30186-E3  
 Positional errors in hydroacoustic navigation  
 Lars Gøtherström April 1980

The main section of the report is devoted to navigational errors caused by the propagation of hydroacoustic waves and its anomalies. The effect of noise and interference is also studied. Estimates are provided of the rms error for distance and bearing as a function of a number of parameters such as the s/n ratio, filter bandwidth, pulse width, beam width, wavelength, the geometrical dimensions of hydrophone groups, the distance from transmitter to receiver, etc.

The report concludes with a discussion of the orders of magnitude for different types of positional error, and recommends measures for the limitation of errors.

See also (171), (172), (175) and (176).

E2 Communications

- (180) FOA Report C 30187-E2  
 Data obtained in radiowave propagation experiments on the path Kiruna-Stockholm  
 (in English)  
 Mats Bröms and others May 1980

The report gives an account of information obtained from experiments in radio wave propagation in the short-wave band over the Kiruna-Stockholm measuring path, with a brief description of the equipment.

See also (171) and (176).

E3 Guidance, navigation and target identification

- (181) FOA Report C 20357-E3  
*CONDIS* - a development of the simulation package *COMBINEDSIMULATION*  
 Lennart Månsson May 1980

This Report describes some developments of the simulation package *COMBINEDSIMULATION* (Keld Helsgaun, Roskilde University, Denmark).

*COMBINEDSIMULATION* is a Simula-class intended for simulation of dynamic systems in an environment with discontinuous variations of equations of state and differential equations. This class also contains facilities for solving ordinary differential equations by means of numerical integration. The discontinuous variations of state and differential equations can be planned using normal concepts from *SIMULATION*, which means that complicated event-controlled simulations can be performed.

The main section of the research has resulted in a Simula class designated *CONDIS*.

*CONDIS* is intended for use on the DEC-10 system at the Stockholm Computer Centre QZ, and employs some of its library routines.

*CONDIS* differs from *COMBINEDSIMULATION* chiefly in two respects. Firstly a new alternative integration method has been introduced, which is a 4th-order predictor-corrector method with detection of discontinuities, and secondly *CONDIS* incorporates a facility by which, after the program has detected certain errors, it can study and vary the parameters in order if possible to be able to resume operation.

- (182) FOA Report C 30186-E3  
 Positional errors in hydroacoustic navigation  
 Lars Gøtherström April 1980

The main section of the report is devoted to navigational errors caused by the propagation of hydroacoustic waves and its anomalies. The effect of noise and interference is also studied. Estimates are provided of the rms error for distance and bearing as a function of a number of parameters such as the s/n ratio, filter bandwidth, pulse width, beam width, wavelength, the geometrical dimensions of hydrophone groups, the distance from transmitter to receiver, etc.

The report concludes with a discussion of the orders of magnitude for different types of positional error, and recommends measures for the limitation of errors.

See also (171), (172), (175) and (176).





The report describes an experimental study, from the standpoint of labelling theory, of the consequences for self-perception of the exemption from military service on psychiatric grounds. The study shows that there is a tendency to lay greater blame on intra-personal factors as regards the causes of misfortune in persons who are so labelled, and that in terms of personality they are assessed more negatively with respect to a number of qualities. If an individual is described in terms of the general problems of life instead of in terms of mental illness, it is felt that no such personal disqualification will arise. The consequences of this for private individuals and for the Defence services and their relations with the public as a whole are discussed.

(187) FOA Report C 55039-H1  
 Manpower wastage from military service - analysis and summary of a current behavioural study and results of research  
 Gerry Larsson May 1980

The purpose of this Report is to provide a summary of existing results in behavioural science concerning wastage from national service. The introduction sets out the various types of wastage, followed by wastage on the grounds of diagnosed psychiatric illness. The relevance of this diagnosis is discussed, as certain studies have indicated that many Defence personnel subjected to psychiatric diagnosis have received it on scientifically dubious grounds. The reasons for wastage from national service are analysed. Drop-outs during basic training are thought to be mainly due to factors at the group and organisation level, *eg* poor relations, unit location far from the home district etc. The results of various measures adopted to reduce the number of national service drop-outs are discussed. The greatest effect of these consists of recommendations from a senior military level as to the desirable rate of drop-outs in recent years. The consequences of national service drop-outs are examined from the following points of view: military defence, types of individuals who drop out, the services as a sector of society and psychiatry in the Defence services. Apart from these standpoints, the report concludes with a summary of current research and the need for future research into the problem of national service drop-outs.

(188) FOA Report C 60006-H1  
 Theoretical analyses of certain problems in predictive science  
 Jan Agrell May 1980

The report begins by discussing the constraints which predictive science in particular must attempt to overcome. Attention is then turned to the possibilities of making predictions, with illustrations in the context of the situation in the fields of the astronomical, climatological, biological and social sciences. Special attention is next paid to what are termed discrete events and the possibility of predicting them by means of their degree of probability. Finally against the background of a successive projection of the development of population in Sweden, an outline is given of a computer-based experiment in prediction in this field, using different series of variables derived from official Swedish statistics dating from the 1750s onward.

The report describes an experimental study, from the standpoint of labelling theory, of the consequences for self-perception of the exemption from military service on psychiatric grounds. The study shows that there is a tendency to lay greater blame on intra-personal factors as regards the causes of misfortune in persons who are so labelled, and that in terms of personality they are assessed more negatively with respect to a number of qualities. If an individual is described in terms of the general problems of life instead of in terms of mental illness, it is felt that no such personal disqualification will arise. The consequences of this for private individuals and for the Defence services and their relations with the public as a whole are discussed.

(187) FOA Report C 55039-H1  
 Manpower wastage from military service - analysis and summary of a current behavioural study and results of research  
 Gerry Larsson May 1980

The purpose of this Report is to provide a summary of existing results in behavioural science concerning wastage from national service. The introduction sets out the various types of wastage, followed by wastage on the grounds of diagnosed psychiatric illness. The relevance of this diagnosis is discussed, as certain studies have indicated that many Defence personnel subjected to psychiatric diagnosis have received it on scientifically dubious grounds. The reasons for wastage from national service are analysed. Drop-outs during basic training are thought to be mainly due to factors at the group and organisation level, *eg* poor relations, unit location far from the home district etc. The results of various measures adopted to reduce the number of national service drop-outs are discussed. The greatest effect of these consists of recommendations from a senior military level as to the desirable rate of drop-outs in recent years. The consequences of national service drop-outs are examined from the following points of view: military defence, types of individuals who drop out, the services as a sector of society and psychiatry in the Defence services. Apart from these standpoints, the report concludes with a summary of current research and the need for future research into the problem of national service drop-outs.

(188) FOA Report C 60006-H1  
 Theoretical analyses of certain problems in predictive science  
 Jan Agrell May 1980

The report begins by discussing the constraints which predictive science in particular must attempt to overcome. Attention is then turned to the possibilities of making predictions, with illustrations in the context of the situation in the fields of the astronomical, climatological, biological and social sciences. Special attention is next paid to what are termed discrete events and the possibility of predicting them by means of their degree of probability. Finally against the background of a successive projection of the development of population in Sweden, an outline is given of a computer-based experiment in prediction in this field, using different series of variables derived from official Swedish statistics dating from the 1750s onward.

H3 Environmental extremes

- (189) H3  
Biochemical effects altering seizure mechanisms of acute oxygen poisoning  
Bengt Segerbo (in English)  
Academic thesis, 16 May 1980.

H6 Individual and group efficiency

- (190) FOA Report B 54013-H6  
Vegetable extract as a protection against disease-bearing insects  
W. Thorsell and others

Continuing developments in biology require, among other things, that new control methods should be devised as a protection from, *eg* disease-bearing insects. As part of this activity we are studying new synthetic products. While testing them in the field we have noticed a certain effectiveness in a number of natural products (Thorsell *et al*, 1978). This article describes some experiments with hydrophilic and lipophilic extracts of camomile, tomato, rosemary, marsh tea and bog myrtle, with regard to their effects on mosquitoes, lice and flies.

Offprint from Ent. Tidskrift (1979), 100, 138-141.

FOA Reprints 1979/80:22.

- (191) FOA Report B 57014-H6, H7  
Changes in lipoprotein-lipase activity and lipid stores in human skeletal muscle with prolonged heavy exercise (in English)  
Hans Lithell and others

Lipoprotein-lipase (LPL) activity and the quantity of triglycerides (TG) stored intracellularly were determined from muscle biopsies from seven volunteers, before and after a ski run of 85 km. The store of TG before the run was five times higher in slow than in fast muscle fibres. LPL activity increased and the store of TG in slow muscle fibres decreased in the course of the run. The most well-trained skiers had the highest store of TG before the run, and their store was reduced during the run more than the store of TG in the less well-trained. In the most well-trained skiers LPL activity increased only slightly, whereas a sixfold increase was observed in the least well-trained subjects. The higher LPL activity exhibited by the less well-trained after the run indicates a higher uptake of fatty acids from the bloodstream compared with the most well-trained skiers.

Offprint from Acta physiol. scand. (1979), 107, 257-261.

FOA Reprints 1979/80:20.

- (192) FOA Report B 57015-H6  
EMG frequency spectrum, muscle structure and fatigue during dynamic contractions in man (in English)  
Paavo Komi and Per Tesch

Fatigue of the thigh muscles was studied in fresh, physically well-trained students. The variation in muscular power due to repeated maximum knee extensions at a constant angular speed ( $180^{\circ} \times s^{-1}$ , or about 30% of the optimum angular speed of the muscle) was taken as an expression of the degree of fatigue. Muscular force was recorded by means of an isokinetic strength measuring apparatus.

H3 Environmental extremes

- (189) H3  
Biochemical effects altering seizure mechanisms of acute oxygen poisoning  
Bengt Segerbo (in English)  
Academic thesis, 16 May 1980.

H6 Individual and group efficiency

- (190) FOA Report B 54013-H6  
Vegetable extract as a protection against disease-bearing insects  
W. Thorsell and others

Continuing developments in biology require, among other things, that new control methods should be devised as a protection from, *eg* disease-bearing insects. As part of this activity we are studying new synthetic products. While testing them in the field we have noticed a certain effectiveness in a number of natural products (Thorsell *et al*, 1978). This article describes some experiments with hydrophilic and lipophilic extracts of camomile, tomato, rosemary, marsh tea and bog myrtle, with regard to their effects on mosquitoes, lice and flies.

Offprint from Ent. Tidskrift (1979), 100, 138-141.

FOA Reprints 1979/80:22.

- (191) FOA Report B 57014-H6, H7  
Changes in lipoprotein-lipase activity and lipid stores in human skeletal muscle with prolonged heavy exercise (in English)  
Hans Lithell and others

Lipoprotein-lipase (LPL) activity and the quantity of triglycerides (TG) stored intracellularly were determined from muscle biopsies from seven volunteers, before and after a ski run of 85 km. The store of TG before the run was five times higher in slow than in fast muscle fibres. LPL activity increased and the store of TG in slow muscle fibres decreased in the course of the run. The most well-trained skiers had the highest store of TG before the run, and their store was reduced during the run more than the store of TG in the less well-trained. In the most well-trained skiers LPL activity increased only slightly, whereas a sixfold increase was observed in the least well-trained subjects. The higher LPL activity exhibited by the less well-trained after the run indicates a higher uptake of fatty acids from the bloodstream compared with the most well-trained skiers.

Offprint from Acta physiol. scand. (1979), 107, 257-261.

FOA Reprints 1979/80:20.

- (192) FOA Report B 57015-H6  
EMG frequency spectrum, muscle structure and fatigue during dynamic contractions in man (in English)  
Paavo Komi and Per Tesch

Fatigue of the thigh muscles was studied in fresh, physically well-trained students. The variation in muscular power due to repeated maximum knee extensions at a constant angular speed ( $180^{\circ} \times s^{-1}$ , or about 30% of the optimum angular speed of the muscle) was taken as an expression of the degree of fatigue. Muscular force was recorded by means of an isokinetic strength measuring apparatus.

In order to study the quantitative and qualitative changes in EMG (electromyography), integrated EMG (IEMG) and the mean power frequency (MPF) of EMG were analysed. Briefly, MPF describes the frequency with which the majority of motor units, activated during a contraction, are discharged.

Individuals with a high percentage of fast contracting (FT) muscle fibres in m. vastus lateralis exhibited a higher maximum muscle power and lower stamina than those having a large amount of slowly contracting (ST) muscle fibres. IEMG significantly decreased ( $p < 0.01$ ) during 100 contractions in a group of individuals with a high percentage of FT fibres, whereas a small (non-significant) reduction in IEMG occurred in those having muscles with a large proportion of ST fibres. The MPF decreased by 26% ( $p < 0.001$ ) in persons having a high percentage of FT fibres, while those having a high percentage of ST fibres exhibited only a small (non-significant) decrease.

To judge by the results, a relation appears to exist between acute deterioration of muscular function and qualitative changes in the recovery pattern of a motor unit. These changes take place earlier and to a greater extent in muscles dominated by FT fibres than in those consisting largely of ST fibres.

Offprint from Eur. J. Appl. Physiol. (1979), 42, 41-50.

FOA Reprints 1979/80:21.

(193) FOA Report C 57005-H6  
Physical efficiency. Short-term information requirements of the National Service Department  
Jan Karlsson

H9 Man and machine systems

(194) FOA Report C 56022-H9  
Real-time simulation on a landscape model. I General description  
Kenth Carlsson June 1980

A simulator is presented whose main constituent is a model of an actual stretch of ground. By means of peripheral equipment the landscape model is intended for use in the environmental simulation of experiments on the actual ground.

A two-axial rotary table placed on the floor alongside the landscape model is used as a platform for sighting, observing and weapon equipment. The rotary table records the alignment of the equipment with very good resolution. A laser pointer suspended from the ceiling above the rotary table is used for indicating, e.g. the impact of projectiles on the surface of the model. Propulsion of targets over the surface of the model is done by a stepping motor with associated electronics. A digital computer performs all the computations during a simulation operation, and controls or is controlled by those parts in the simulator which are equipped with electronic components.

Among other things, the existing configuration provides studies of problems in anti-tank warfare.

The report describes one other application, simulated firing at stationary and moving targets with the M/48 grenade-thrower.

Finally some suggestions are offered for development and for other fields of application.

In order to study the quantitative and qualitative changes in EMG (electromyography), integrated EMG (IEMG) and the mean power frequency (MPF) of EMG were analysed. Briefly, MPF describes the frequency with which the majority of motor units, activated during a contraction, are discharged.

Individuals with a high percentage of fast contracting (FT) muscle fibres in m. vastus lateralis exhibited a higher maximum muscle power and lower stamina than those having a large amount of slowly contracting (ST) muscle fibres. IEMG significantly decreased ( $p < 0.01$ ) during 100 contractions in a group of individuals with a high percentage of FT fibres, whereas a small (non-significant) reduction in IEMG occurred in those having muscles with a large proportion of ST fibres. The MPF decreased by 26% ( $p < 0.001$ ) in persons having a high percentage of FT fibres, while those having a high percentage of ST fibres exhibited only a small (non-significant) decrease.

To judge by the results, a relation appears to exist between acute deterioration of muscular function and qualitative changes in the recovery pattern of a motor unit. These changes take place earlier and to a greater extent in muscles dominated by FT fibres than in those consisting largely of ST fibres.

Offprint from Eur. J. Appl. Physiol. (1979), 42, 41-50.

FOA Reprints 1979/80:21.

(193) FOA Report C 57005-H6  
Physical efficiency. Short-term information requirements of the National Service Department  
Jan Karlsson

H9 Man and machine systems

(194) FOA Report C 56022-H9  
Real-time simulation on a landscape model. I General description  
Kent Carlsson June 1980

A simulator is presented whose main constituent is a model of an actual stretch of ground. By means of peripheral equipment the landscape model is intended for use in the environmental simulation of experiments on the actual ground.

A two-axial rotary table placed on the floor alongside the landscape model is used as a platform for sighting, observing and weapon equipment. The rotary table records the alignment of the equipment with very good resolution. A laser pointer suspended from the ceiling above the rotary table is used for indicating, e.g. the impact of projectiles on the surface of the model. Propulsion of targets over the surface of the model is done by a stepping motor with associated electronics. A digital computer performs all the computations during a simulation operation, and controls or is controlled by those parts in the simulator which are equipped with electronic components.

Among other things, the existing configuration provides studies of problems in anti-tank warfare.

The report describes one other application, simulated firing at stationary and moving targets with the M/48 grenade-thrower.

Finally some suggestions are offered for development and for other fields of application.

- (195) FOA Report C 58007-H9  
 Functional study of diving gauntlets  
 John Adolfson and others March 1980

A study of six ordinary commercial types of diving gauntlets was performed at a depth of 30 m with ten divers, who were tested for manual strength, mobility of fingers and hands and finger sensitivity. Water temperatures varied between 1.7 and 3.7°C, and diving periods between 38 and 58 minutes. No appreciable fall in rectal temperature was observed during the 62 dives. Skin temperature on the hands however fell rapidly as soon as diving began.

Manual strength was considerably reduced, and also mobility and finger sensitivity. The results are discussed in the report, and it has been possible to make certain recommendations. Since neoprene and nylonprene are compressible they lose their heat-insulating power under water. Divers' gauntlets should therefore be made from incompressible material. Hand coverings should also be supplemented by an inner glove of some soft textile with a good heat-insulating ability. These questions should form part of an additional investigation. It is also highly important for gauntlets to be correctly sized to give divers the ability to work with their hands.

M INTERDISCIPLINARY STUDIES AND INVESTIGATIONS

M6 Information systems

- (196) FOA Report C 10053-M6 (H9) (in English)  
 VIEWDATA interface for arbitrary computer programs June 1980  
 Jacob Palme

This Report describes the central algorithms in a computer program for matching a VDU to any desired application program, not specially written to be suitable for this terminal. The matching program divides input and output data into/out of the application program in a manner suitable to the small and non-extensible screen on the VDU.

- (197) FOA Report C 10152-M6 (H9) May 1980  
 When does office automation succeed? Report on a symposium  
 Jacob Palme

This Report is a summary of what was said at an international conference 'International Symposium on Office Automation - Emerging Office Systems: Why some work and others fail'.

Important factors for progress with office automation includes knowledge of the actual requirements of the people who are to use the systems, design of systems so that they satisfy the users' actual requirements, and a system design adapted to the group of users. Many systems are produced with a surprising absence of these apparently self-evident factors. To take one simple example, many people think that secretarial staff spend 50% of their working time in writing, the true value (based on observations) being 20%. And many people think that everyone thinks in the same way as data-processing engineers, at least to judge by the systems they design.

In fact communication with other people is the predominant activity in an office, and an appreciation of this is necessary for office automation to succeed.

Another important element is the view of humanity held by those who design these systems, whether it is 'authoritarian' or 'humanistic'.

It is important to achieve a system of a certain 'critical size' so that the users can take sufficient advantage of their mutual communication.

T CERTAIN MEASURES FOR LIMITATION AND CONTROL OF ARMAMENTS

T1 Seismological multiple stations

- (198) FOA Report C 20358-T1  
Internal seismological stations for monitoring a comprehensive test ban treaty  
(in English)  
Ola Dahlman and Hans Israelson June 1980

This Report contains a discussion of the likely application of what are termed local seismological stations which may be set up in the US and Soviet Union for monitoring some future treaty for a comprehensive ban on atomic weapons testing. It considers the technical purposes which might be served by local seismological stations in relation to a worldwide seismological monitoring system for a ban on testing. A description is also given of the American equipment which has been produced for these stations. The report includes a detailed non-technical summary.

T3 Scientific documentation

- (199) FOA Report C 19132-T3  
Disarmament and development. A bibliographical guide to UN studies  
Marie Wüngborg June 1979

The 19th Special Session of the UN General Assembly, which took place in 1978 and was devoted to disarmament, adopted a proposal for the Nordic countries for a UN study of the relationship between disarmament and development.

This Report is an attempt to describe and cite examples of existing available publications on the subject fields with which the UN study will deal. It is intended to be a guide to further studies and research into these and similar questions.

An English version of the report also exists, reference FOA C 19131-13.

- (200) FOA Report C 20355-T3  
Accelerator breeders - experience gained on a visit to the USA in autumn 1979  
Henri Gougeon May 1980

Some considerations are reported which emerged from study visits to a number of laboratories in the USA and Canada in October 1979 concerning the conditions for implementing an advanced nuclear energy project on what are termed accelerator breeders. Special attention is also paid to the technical possibilities of modifying the nuclear fuel cycle in order to render it more resistant to proliferation in terms of nuclear warheads.

A PM from 1978 is appended with certain technical commentaries.

X MISCELLANEOUS (in-house projects etc)

- (201) FOA Report C 60007-X0  
Successful projects. Some specimen types of project  
Ann Kathrine Littke and Per Olov Nilsson April 1980

While engaged on FOA forward planning from autumn 1979 to spring 1980 one of the questions raised was what characterises those activities of the FOA which are felt to have 'succeeded'. This gave rise to an analysis and comparison of several different types of assignment and project conducted by the FOA, some of recent date and others less

It is important to achieve a system of a certain 'critical size' so that the users can take sufficient advantage of their mutual communication.

T CERTAIN MEASURES FOR LIMITATION AND CONTROL OF ARMAMENTS

T1 Seismological multiple stations

- (198) FOA Report C 20358-T1  
Internal seismological stations for monitoring a comprehensive test ban treaty  
(in English)  
Ola Dahlman and Hans Israelson June 1980

This Report contains a discussion of the likely application of what are termed local seismological stations which may be set up in the US and Soviet Union for monitoring some future treaty for a comprehensive ban on atomic weapons testing. It considers the technical purposes which might be served by local seismological stations in relation to a worldwide seismological monitoring system for a ban on testing. A description is also given of the American equipment which has been produced for these stations. The report includes a detailed non-technical summary.

T3 Scientific documentation

- (199) FOA Report C 19132-T3  
Disarmament and development. A bibliographical guide to UN studies  
Marie Wüngborg June 1979

The 19th Special Session of the UN General Assembly, which took place in 1978 and was devoted to disarmament, adopted a proposal for the Nordic countries for a UN study of the relationship between disarmament and development.

This Report is an attempt to describe and cite examples of existing available publications on the subject fields with which the UN study will deal. It is intended to be a guide to further studies and research into these and similar questions.

An English version of the report also exists, reference FOA C 19131-13.

- (200) FOA Report C 20355-T3  
Accelerator breeders - experience gained on a visit to the USA in autumn 1979  
Henri Gougeon May 1980

Some considerations are reported which emerged from study visits to a number of laboratories in the USA and Canada in October 1979 concerning the conditions for implementing an advanced nuclear energy project on what are termed accelerator breeders. Special attention is also paid to the technical possibilities of modifying the nuclear fuel cycle in order to render it more resistant to proliferation in terms of nuclear warheads.

A PM from 1978 is appended with certain technical commentaries.

X MISCELLANEOUS (in-house projects etc)

- (201) FOA Report C 60007-X0  
Successful projects. Some specimen types of project  
Ann Kathrine Littke and Per Olov Nilsson April 1980

While engaged on FOA forward planning from autumn 1979 to spring 1980 one of the questions raised was what characterises those activities of the FOA which are felt to have 'succeeded'. This gave rise to an analysis and comparison of several different types of assignment and project conducted by the FOA, some of recent date and others less

recent. The study is documented in this Report. It was also intended by this means to assist in providing the new generation of FOA members who are now growing up some knowledge of some earlier activities of the FOA and of their importance to the Defence services. We consider this to be important.

(202) FOA Report C 60008-XO  
The future of defence research  
Ann Kathrine Littke and Per Olov Nilsson June 1980

Just before the Defence Research plans for 1980/81 got underway, the FOA appointed a long-term study group directly under the control of the Director-General. Besides the Director-General Nils-Henrik Lundquist, the group consisted of Senior Divisional Head Carl Gustav Jennergren, Senior Engineers Per Olov Nilsson and Lars Högberg of FOA 1, and Ann Kathrine Littke, FOA Ck. Divisional Heads Jörgen Thulstrup and Petter Wikström acted as respective contact men for programme planning and long-term planning. Anders Risling, a research member of FOA 5, supervised the arrangement of the work from the behavioural scientific aspects.

The report summarises the relevant part of the information assembled by the working party of the group (the authors of the report) during the preparatory stage, and of the opinions put forward in discussions within the group and with a great many of the FOA research staff. This information is of course more extensive than can reasonably be submitted in the form of direct documentation just before the programme begins, and in particular before the Divisional Heads' meeting in autumn 1980. However it forms a fuller and more explanatory background to the views expressed in the FOA projections for Defence research. For anyone wanting a clearer case put for the views expressed in those projections, it may therefore be more valuable to read this more detailed version.

The principle underlying the outline is that Defence research forms a part of two otherwise quite dissimilar social activities, namely overall defence and the scientific community. From both quarters working results and opinions can be derived as to the desirable manner in which to proceed. Both however give rise to constraints. It has been the authors' intention to clarify the requirements and constraints with which Defence research has to work, and the freedom of action or the options available in the future. The reader's guide in section 1 and the detailed table of contents may assist the reader in finding the discussion of any particular subject.

The conclusions drawn - those of the working party and those stated by the authors - are collected in section 8. Section 8.5 contains the working party's view of the objectives of Defence research in January 1980, and these views formed the basis of continued discussions among the Directorate and management of FOA during the winter and spring of 1980. The opinions advanced in section 8 are repeated in the FOA projections (June 1980).

#### EMERGENCY COUNCIL FOR PSYCHOLOGICAL DEFENCE

(203) BN Report No.98  
Radio Malmöhus and the snowstorm  
Bertil Flodin (Lund University) January 1980

A study of the exchange of information among the local radio, the public and the public authorities during the snowstorm in Skåne in the new year 1979. The

recent. The study is documented in this Report. It was also intended by this means to assist in providing the new generation of FOA members who are now growing up some knowledge of some earlier activities of the FOA and of their importance to the Defence services. We consider this to be important.

(202) FOA Report C 60008-XO  
The future of defence research  
Ann Kathrine Littke and Per Olov Nilsson June 1980

Just before the Defence Research plans for 1980/81 got underway, the FOA appointed a long-term study group directly under the control of the Director-General. Besides the Director-General Nils-Henrik Lundquist, the group consisted of Senior Divisional Head Carl Gustav Jennergren, Senior Engineers Per Olov Nilsson and Lars Högberg of FOA 1, and Ann Kathrine Littke, FOA Ck. Divisional Heads Jörgen Thulstrup and Petter Wikström acted as respective contact men for programme planning and long-term planning. Anders Risling, a research member of FOA 5, supervised the arrangement of the work from the behavioural scientific aspects.

The report summarises the relevant part of the information assembled by the working party of the group (the authors of the report) during the preparatory stage, and of the opinions put forward in discussions within the group and with a great many of the FOA research staff. This information is of course more extensive than can reasonably be submitted in the form of direct documentation just before the programme begins, and in particular before the Divisional Heads' meeting in autumn 1980. However it forms a fuller and more explanatory background to the views expressed in the FOA projections for Defence research. For anyone wanting a clearer case put for the views expressed in those projections, it may therefore be more valuable to read this more detailed version.

The principle underlying the outline is that Defence research forms a part of two otherwise quite dissimilar social activities, namely overall defence and the scientific community. From both quarters working results and opinions can be derived as to the desirable manner in which to proceed. Both however give rise to constraints. It has been the authors' intention to clarify the requirements and constraints with which Defence research has to work, and the freedom of action or the options available in the future. The reader's guide in section 1 and the detailed table of contents may assist the reader in finding the discussion of any particular subject.

The conclusions drawn - those of the working party and those stated by the authors - are collected in section 8. Section 8.5 contains the working party's view of the objectives of Defence research in January 1980, and these views formed the basis of continued discussions among the Directorate and management of FOA during the winter and spring of 1980. The opinions advanced in section 8 are repeated in the FOA projections (June 1980).

#### EMERGENCY COUNCIL FOR PSYCHOLOGICAL DEFENCE

(203) BN Report No.98  
Radio Malmöhus and the snowstorm  
Bertil Flodin (Lund University) January 1980

A study of the exchange of information among the local radio, the public and the public authorities during the snowstorm in Skåne in the new year 1979. The

investigation is based on continuous listening-in to broadcasts from Radio Malmöhus during the period and on interviews with leading members of the authorities and local radio.

- (204) BN Report No.99  
Attitudes to defence and confidence in the future  
Gertie Elsässer April 1980

This Report presents the results of a number of questionnaires, both on confidence in the future and on attitudes towards defence. The latter questions have been derived from investigations by the Emergency Council itself. An account is given of the relationship between both these types of question.

- (205) BN Report No.100  
Psychological warfare up to the 1990s  
Kurt Törnqvist May 1980

This Report attempts to draw a picture of the future development of psychological warfare. Among other things it discusses some changes which may occur in psychological warfare with changes in technique, the emergence of new agents, changes in the target groups, developments in the mass media etc. The ways in which future psychological warfare directed at Sweden may develop are discussed, starting from four different future scenarios.

- (206) BN Report No.101  
Research for the Emergency Council  
Kurt Törnqvist and Ingemar Staaf May 1980

This Report contains a brief survey of research by the Emergency Council from 1955-80. The 100 published research reports are listed by subject and author.

- (207) BN Report No.102  
Attitudes to international relations and defence  
Kurt Törnqvist June 1980

The result is presented of an opinion survey during the spring. The inquiry covers among other things the public's attitude to the superpowers, anxiety about the world situation and attitudes to armed resistance.

- (208) BN Report No.103  
Credibility and confidence, reliability and reliance  
Peter Arvidson (Lund University) June 1980

An experiment in empirically measuring four specific concepts involving confidence. The population consisted of just on 500 secondary school pupils. By means of a group questionnaire in two parts and using two question forms, their mass-media habits were tabulated and their attitude measured towards these four concepts of confidence.

- (209) BN Communication No.84  
A re-assessment of public opinion  
Elisabeth Noelle-Neumann (Public Opinion Quarterly)  
Translated by Kurt Törnqvist and Tove Eriksson January 1980

Proceeding from the classical tradition (Locke, Hume and Rousseau), the author has re-assessed and analysed the concept of public opinion. She advances her own theory on the spiral of silence and draws some explanatory conclusions concerning the role and significance of public opinion.

investigation is based on continuous listening-in to broadcasts from Radio Malmöhus during the period and on interviews with leading members of the authorities and local radio.

- (204) BN Report No.99  
Attitudes to defence and confidence in the future  
Gertie Elsässer April 1980

This Report presents the results of a number of questionnaires, both on confidence in the future and on attitudes towards defence. The latter questions have been derived from investigations by the Emergency Council itself. An account is given of the relationship between both these types of question.

- (205) BN Report No.100  
Psychological warfare up to the 1990s  
Kurt Törnqvist May 1980

This Report attempts to draw a picture of the future development of psychological warfare. Among other things it discusses some changes which may occur in psychological warfare with changes in technique, the emergence of new agents, changes in the target groups, developments in the mass media etc. The ways in which future psychological warfare directed at Sweden may develop are discussed, starting from four different future scenarios.

- (206) BN Report No.101  
Research for the Emergency Council  
Kurt Törnqvist and Ingemar Staaf May 1980

This Report contains a brief survey of research by the Emergency Council from 1955-80. The 100 published research reports are listed by subject and author.

- (207) BN Report No.102  
Attitudes to international relations and defence  
Kurt Törnqvist June 1980

The result is presented of an opinion survey during the spring. The inquiry covers among other things the public's attitude to the superpowers, anxiety about the world situation and attitudes to armed resistance.

- (208) BN Report No.103  
Credibility and confidence, reliability and reliance  
Peter Arvidson (Lund University) June 1980

An experiment in empirically measuring four specific concepts involving confidence. The population consisted of just on 500 secondary school pupils. By means of a group questionnaire in two parts and using two question forms, their mass-media habits were tabulated and their attitude measured towards these four concepts of confidence.

- (209) BN Communication No.84  
A re-assessment of public opinion  
Elisabeth Noelle-Neumann (Public Opinion Quarterly)  
Translated by Kurt Törnqvist and Tove Eriksson January 1980

Proceeding from the classical tradition (Locke, Hume and Rousseau), the author has re-assessed and analysed the concept of public opinion. She advances her own theory on the spiral of silence and draws some explanatory conclusions concerning the role and significance of public opinion.

- (210) BN Communication No.85  
The agenda function and the theory of mass communication  
Eugene F. Shaw (Gazette)  
Translated by Kurt Törnqvist and Ingemar Staaf March 1980

This communication presents a new and interesting hypothesis as to the way in which the mass media affect the public by their agenda function. The author maintains that his theory is compatible with the propagation or multistage model. The inquiry also throws light on people's use of and satisfaction with the mass media.

- (211) BN Communication No.86  
Propaganda, information and the mass media  
Ingemar Staaf April 1980

An abstract of a Norwegian article in which the relationship is discussed between news reporting and propaganda. It also demonstrates how factors such as the view of the sources of information, the journalist's conception of his role and the public's defective understanding of the way in which the information process functions can mean that information is conveyed in an unsatisfactory manner.

- (210) BN Communication No.85  
The agenda function and the theory of mass communication  
Eugene F. Shaw (Gazette)  
Translated by Kurt Törnqvist and Ingemar Staaf March 1980

This communication presents a new and interesting hypothesis as to the way in which the mass media affect the public by their agenda function. The author maintains that his theory is compatible with the propagation or multistage model. The inquiry also throws light on people's use of and satisfaction with the mass media.

- (211) BN Communication No.86  
Propaganda, information and the mass media  
Ingemar Staaf April 1980

An abstract of a Norwegian article in which the relationship is discussed between news reporting and propaganda. It also demonstrates how factors such as the view of the sources of information, the journalist's conception of his role and the public's defective understanding of the way in which the information process functions can mean that information is conveyed in an unsatisfactory manner.

ADVANCE DISTRIBUTION:

APRE	
AUWE	2
ASWE	
CDE	
DOAE	
DRIC	70
ERDE	
ITC	
BAe	
IAM	
MVEE	2
MRE	
National Reference Library	
Royal Netherlands Embassy	
NAL, Bangalore, India	
NGTE	
RSRE, Malvern	
RARDE	
RMCS	
SHAPE	
Zambian Embassy	

RAE

DD(A)  
DD(E)  
DD(W)  
Main Library  
Heads of Departments  
Weapons Library  
Heads of Weapons Divisions

ADVANCE DISTRIBUTION:

APRE	
AUWE	2
ASWE	
CDE	
DOAE	
DRIC	70
ERDE	
ITC	
BAe	
IAM	
MVEE	2
MRE	
National Reference Library	
Royal Netherlands Embassy	
NAL, Bangalore, India	
NGTE	
RSRE, Malvern	
RARDE	
RMCS	
SHAPE	
Zambian Embassy	

RAE

DD(A)  
DD(E)  
DD(W)  
Main Library  
Heads of Departments  
Weapons Library  
Heads of Weapons Divisions

DATE

ILMED

-8

DATE

ILMED

-8