

# D T E L S

The Communications  
Business of the  
Home Office



## ENGINEERING CONSULTANCY

- Independent Radio Systems Design Consultancy
- Over 45 years of market experience
- Wide range of services provided
- Diversity of customers including the emergency services and HM Prisons
- Full maintenance and installation support

For further information please contact  
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The Communications Business of the Home Office

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## 1. AN INTRODUCTION TO DTELS

DTELS was set up initially in 1946 to procure, install and maintain communications equipment for the Police Forces in England and Wales. Later DTELS services were extended to Fire Brigades, HM Prisons and Civil Defence. The organisation has enjoyed an unparalleled 45 years of experience in the telecommunications market, satisfying the engineering, installation and maintenance requirements of Police Forces and Fire Brigades in England and Wales. The client base has now been expanded to include Ambulance Services, County Councils and other organisations.

As part of the Home Office Science and Technology Group, DTELS is a specialist engineering, installation and maintenance organisation. Through its Operations (installation and maintenance) and Engineering Consultancy sections, DTELS provide a comprehensive service which is completely independent of any equipment manufacturer.

DTELS has demonstrated a strong commitment to the principles of Total Quality Management, being one of the first service organisations in the UK to be registered under BS5750. Personal radio maintenance, test equipment calibration and corporate registration have already been achieved. The campaign to extend registration throughout the whole spectrum of DTELS activities before 1995 is well under way. Quality Assurance services are now offered to clients (to BS6001) to ensure that the equipment that they are considering for purchase meets with both their particular individual requirements and the strict standards governing equipment specification.

All organisations currently involved in the provision of communications support to the emergency services operate in a dynamic environment of increasing complexity. Technological progress, changes in Government policy and regulations as well as the growing operational demands place an increasing pressure on managers with the responsibility for delivering effective communications support. In view of this DTELS invests heavily in training, maintaining a specialised section to ensure that staff remain abreast of critical developments in equipment technology and techniques. Now, more than ever, it is essential that a telecommunications contractor has the capability to keep pace with this changing environment. DTELS has proved that it has this capability.

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## 2. DTELS ENGINEERING CONSULTANCY

DTELS Engineering Consultancy, based at Headquarters in Horseferry House, London, is staffed by trained engineers, experienced in a wide range of relevant areas in the radio communications industry.

DTELS Engineering Consultancy provides a high quality, professional service in the following areas:

- **System feasibility studies**  
*To assist in determining the best way to develop communication systems*  
*To determine the best solutions to specific problems*
- **Technical support to clients**  
*Radio scheme auditing*  
*Radio surveys of VHF and UHF coverage and microwave links*  
*Quality Assurance acceptance testing*  
*Specialised design work*
- **Assistance in the design, planning and procurement of new communications systems**
- **Supervision of equipment suppliers and installers**
- **Radio site planning and management**
- **Test and investigation of equipment and systems, equipment evaluation and field trials**

Further details of the above services can be found in the Information Sheets.

DTELS Engineering Consultancy's considerable expertise covers:

- **VHF multi-base station, wide-area coverage mobile radio systems. Base stations, aerial systems and mobile radios**
- **UHF single base-station and multi-base station, extended coverage personal radio systems. Base stations, aerial systems and personal radios.**
- **Radio encryption**
- **Radio alarm systems**
- **Fixed link networks, including microwave and line based systems using modern digital technology**
- **Integrated communications control systems**

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- **Closed circuit television**
- **Site management**

DTELS has a commitment to establishing and maintaining expertise in new areas of communications via in-house studies and investigations including:

- |                        |                               |
|------------------------|-------------------------------|
| ● Trunked mobile radio | ● Digital microwave           |
| ● Cellular/PCN systems | ● CCTV via 60 GHz radio links |
| ● 50 GHz systems       | ● Fibre optics                |
| ● Digital systems      | ● Control systems             |

The key features of DTELS Consultancy are:-

- **Commercial independence**

As a commercially independent consultancy, DTELS is able to provide completely unbiased advice. The speed of technological change in the field of radio telecommunications, shorter product life cycles and problems of compatibility all place a greater emphasis on the importance of maintaining freedom of action when considering new equipment. Our clients know the dangers of being tied to one supplier for equipment and maintenance, inhibiting their ability to react positively to future technological enhancements.

- **Proven experience**

Providing professional communications consultancy services requires an in-depth understanding of client needs. DTELS has:

Unrivalled expertise in communications engineering for the emergency services, having engineered and maintained the radio communications systems of the majority of the Police and Fire Services in England and Wales for over 45 years.

A sound understanding of the operational communication requirements of the emergency services; this enable us to allocate appropriate resources to real priorities. DTELS consultants have a detailed knowledge a wide range of equipment and systems, including portable and mobile radios and base stations, linking networks and communication control systems.

Consultants familiar with the operational localities and radio transmission characteristics of most parts of England and Wales, thus enabling DTELS to respond quickly to client requirements.

A good knowledge of regulatory issues, liaising with OFTEL and the Radiocommunications Agency of the Department of Trade and Industry on such matters as telecomms policy, frequency allocations, interference, licensing and equipment specifications.

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- **Professional organisation**

DTELS has achieved registration under the British Standard BS 5750 for personal radio maintenance and test equipment calibration. Work is being carried out to extend registration throughout the organisation.

Formal computer based project management techniques are used to control the assignments carried out for clients. DTELS can provide this service to clients on a wider basis as required.

DTELS provides thorough and updated staff training to ensure that our high standards of technical skills are maintained.

- **Security clearance**

Staff have established clearances to work in security-sensitive areas

In summary, some of the major advantages offered by DTELS are:

- **A breadth and independence of expertise**
- **An understanding of a wide range of operational needs among users of telecommunications**
- **Strength in depth of the services offered**
- **A commitment to a programme of continuing development and improvement of service and efficiency levels**

Based on many years of experience, DTELS recognises the importance of understanding and meeting clients individual operational needs. We offer highly developed project management skills which will enable us to provide you with a cost-effective programme to meet your operational deadlines.

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**Bearer Systems for Fire Mobilising Data**

Recent technical and commercial developments have increased the options available to Brigades for carrying mobilising data between Control Centres and Fire Stations.

The potential use of printers and fax machines on board appliances has meant that new communications systems need to be designed with capacity for future requirements.

DTELS Engineering Consultancy, with its proven experience in these particular areas can:

- **Assist you to define your Operational Requirement**
- **Identify bearer options**
- **Assess the options, examining aspects including:**

*Facilities provided*

*Types of traffic that can be carried*

*Resilience / risk analysis*

*Regulatory issues*

*Interfacing*

*Whole-life cost comparisons*

- **Prepare a report enabling you to decide on the best strategy for your Brigade**



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**Project Engineering for System Implementation**

The procurement of modern radio communications systems demands specialist technical expertise to ensure that the performance of the delivered system really meets your operational requirement in the most cost-effective way.

DTELS has extensive experience in providing project engineering services to implement comprehensive and sophisticated systems, such as:

- **Assisting client to define user requirement**
- **System planning to meet operational needs**
- **Radio surveys of area coverage and point to point links**
- **Assisting licence applications**
- **Technical specification for tender**
- **Tender evaluation**
- *Technical compliance and vendor assessment*
- **Project management**
  - Formal, computer based procedures*
  - Project network for critical path analysis*
  - Supervise manufacture, installation and commissioning*
  - Monthly progress reports*
- **Quality Assurance of system and equipment performance**



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## New Communication Networks

Regulatory changes being implemented by OFTEL/DTI give users greatly increased choice in the provision of telecommunication facilities. In particular a new class licence allows users to set up and operate 'self-provided' networks, carrying a variety of traffic types, eg telephony, data, telemetry and control of mobile radio systems etc.

This presents an ideal opportunity for organisations to review their communication network strategy to ensure that it is implemented in the most cost-effective manner.

DTELS Engineering Consultancy is able to carry out feasibility studies for clients to assist their communications strategy decisions, and can:

- Assist you to define the network requirement, identifying traffic types, density and routing and network resilience
- Identify the bearer options, including both private microwave systems and services leased from the PTOs
- Construct network configurations
- Assess the various options against the network requirement, examining criteria such as:

*Expansion potential*

*Whole-life costs*

*Security*

*Maintenance implications*

- Prepare a report to enable you to decide on the best strategy for your organisation



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### Radio Coverage Surveys

DTELS has the capability to carry out radio coverage surveys from undeveloped or existing sites at VHF and UHF. Two options are available to suit clients needs and budgetary requirements.

- **Computer predictions**

DTELS Engineering Consultancy has access to computing facilities that incorporate a database of the topographical features of the United Kingdom and the use of this topographic database allows a prediction to be made of the mean value of signal strength in areas of 0.25 kilometre squares. However since the database does not contain details of embankments, cuttings, bridges or buildings etc the effects of local shadowing have to be estimated by the planning engineer.

The system produces predictions for circular areas which the client can specify to suit local requirements. Typical radii are 30, 60 and 90 km. It is possible to overlap these to give extended area coverage predictions from a group of sites.

- **Physical surveys**

DTELS experience has shown that computer predicted surveys tend to be optimistic but are well suited to initial planning particularly where there are a number of options available. They provide a relatively cheap way of anticipating radio cover from a site prior to making a final choice.

For improved accuracy it is recommend that a physical survey be carried out. DTELS uses a computerised measuring system which is vehicle-bound and driven round the area under test. The computer system measures signals from a test transmitter and transposes the readings to a transparent acetate sheet which can then be overlaid on an Ordnance Survey map. This system has the advantage of being able to measure signal levels in critical locations and shadow areas.



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### **Microwave Radio Link Surveys**

To assist in planning microwave fixed link networks DTELS has a in-house database facility of the United Kingdom terrain.

DTELS Consultants access the facility and enter essential information for each of the two link ends. It is then possible to retrieve the height of the terrain at 250m intervals under the line of the radio link path.

Using software developed in house, the terrain information is displayed on-screen as a path profile. Details such as prominent buildings and vegetation are added to the profile from the inspection of Ordnance Survey maps and local knowledge. Using interactive facilities, various technical parameters may be varied in order to determine the path viability and the optimum antenna arrangement.



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**Technical Support**

DTELS Consultants can provide specialist technical support to clients in key areas of telecommunications planning and management.

**System development studies**

- To assist clients to determine the best way to develop their communication systems, investigating the options that exist for improved coverage, site planning, extra broadcast channels, new fixed networks and new facilities.

**Problem-solving studies**

- To determine the best solution to specific problems. For example, planning studies to overcome an obstructed microwave link, or theoretical studies to identify interference to microwave links.

**Providing specialist technical expertise to clients**

- **Independent technical assessment of equipment trials**

- **Radio scheme auditing**

*Detailed assessment of scheme performance and installation standards*

- **Radio surveys**

*VHF and UHF area coverage  
Microwave fixed links*

- **QA acceptance testing**

- **Specialised design work for clients**

*Custom designed units for client specific applications*



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## Radio Site Management

DTELS Engineering Consultancy has a proven track record, providing radio site management schemes tailored to suit client requirements.

- **Towers**

- Preparation of aerial requirements and installation specifications*
  - Calculation of wind loading for aerial systems*
  - Supervision of contractors installing aerials and Quality Assurance checks*
  - Periodic inspection of aerial systems (electrical and mechanical checks)*
  - Lightning protection systems*

- **Aerial systems**

- Design and specification of complete or part systems, including aerials, feeders, clamps, cleats, connectors, earthing and cable runs*
  - Positioning aerials on structures and identification of suitable feeder runs*
  - Maintenance of complete or part systems (via DTELS Operations group)*
  - Health and Safety requirements*

- **Buildings**

- Planning of equipment room dimensions*
  - Equipment and cable tray positioning*
  - Identification of power supply requirements*
  - Health and Safety requirements*
  - Preparation of installation specifications*

- **Site sharing**

- Checking frequency to ensure Electro Magnetic Compatibility*
  - Advising on regulatory issues*
  - Investigating interference and liaison with regulatory authorities*
  - Planning equipment room and aerial layouts*
  - Identifying suitable locations on towers for applicant's aerials*
  - Advising on charging policy*

- **Audit/Quality assurance**

- Quality management of site installation*
  - Periodic auditing of sites and clients equipment*
  - Health and Safety audits*



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## Test and Investigation Laboratories

DTELS Consultancy has purpose-equipped test laboratories equipped to carry out:

- **Performance tests**

*Tests may be applied in a number of areas including:*

- Antenna
- Personal Radios
- Multiplexers
- Signal Selectors
- Battery Chargers
- VHF/UHF transmitters and receivers
- Microwave radio equipment
- Electronic assemblies and devices
- Audio systems - loudspeakers and Microphones

*Testing meets EMC, MPT, CEPT, EIA and HO specifications and standards including environmental performance examinations over a broad range of frequency, temperature, vibration and humidity standards.*

- **Design and development**

Specification requirements may call for the design of an additional facility, for example, where an interface between incompatible elements is required. Design work can then be carried out.

Once the design has been approved, it can be tested in the laboratory and in the field.

- **Post design services**

These are available when operational problems are experienced by equipment users. DTELS consultants can identify possible remedial action, carry out feasibility studies and recommend an action plan.



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**Closed Circuit Television**

DTELS Consultancy has built on its unique expertise and experience in the use of closed circuit television (CCTV) over the last twenty years, particularly through its valued association with Her Majesty's Prison Service in England and Wales.

- **Remote perimeter surveillance systems**
- **Design and installation standards to meet very stringent requirements**

*Quality, flexibility and reliability*

- **Consultants are available to assist other clients**

*For similar or more modest projects such as shopping centres or car parks*

- **Full and updated knowledge of equipment and techniques maintained**

*Camera and display equipment  
Transmission and switching techniques  
Ancillary Items*

- **Special engineering solutions for given operational requirements**

*Radio links to remote camera sites  
Infra red technology*



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### Digital Networks

As a result of recent changes in legislation, major scope now exists for reducing leased line costs and constructing communications infrastructures.

- **Digital communication networks offer several advantages**
  - High data rates
  - Mixed traffic - speech, data, video
  - Flexible control
  - Codecs can increase capacity
  - Rugged signals
  - Compatible with other modern systems
  - Dynamic assignment of link capacity (intelligent multiplexers)
  - Upgradable as equipment technology advances

DTELS Consultants have acquired broad experience in the field of digital networks. This coupled with the organisation's unique background means that DTELS Engineering Consultancy is ideally placed to determine how such a network could benefit your organisation, examining the technical validity of various options and identifying resulting operating economics.



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### Radio Site Sharing

Radio sites represent a considerable capital investment in the form of aerial support towers and equipment buildings. Owners will often wish to maximise on this investment by making the site available to other users.

Equally, others will wish to minimise their capital outlay and to avoid the potentially lengthy and complex site development process by seeking to share an existing site.

There is therefore a need in such instances to give careful consideration to the administrative and equally important technical aspects of entering into formal agreement.

Given DTELS Consultant's long experience of the numerous issues involved in site sharing arrangements, they are well able to process site sharing applications on behalf of clients. A complete service may be provided to parties who wish to share an existing site, or to those who own a site which they wish to lease part of. Services include:

- **Electro magnetic compatibility measurement**
- **Tower loading**
- **Aerial system design**
- **Lightning protection**
- **Accommodation specifications**
- **Health and safety**
- **Contractual and pricing advice**



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**Communication Control Systems**

DTELS has been associated with the design and supply of control systems and related equipment for the emergency services for over twenty years. In the time an unmatched expertise in specifying the technical needs of customers has been built up.

This expertise covers the smaller, simpler analogue and digital systems limited for use in controlling radio channels, as well as the larger and more complex Integrated Control Systems that employ digital switches and touch screens to manage both radio and telephone channels.

Given its proven experience DTELS Engineering Consultancy can:

- Assist in the definition of Operational Requirements
- Advise on the physical requirements for the system
- Assist with budgetary costings and project planning
- Audit, or prepare technical specifications
- Assist in the selection of possible tenderers
- Evaluate tender returns
- Carry out post tender negotiations
- Provide technical advice throughout the contractual period

DTELS is also able to offer assistance with:

- Factory and/or site QA of systems
- Spares and training requirements
- System warranty and maintenance
- Interfacing to existing equipment
- Removal of old systems



For further information please contact  
**Peter Smith**  
DTELS, Horseferry House, Dean Ryle Street, London SW1P 2AW  
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Guide to Abbreviations

<b>BS5750/6001</b>	British Standard 5750/6001
<b>CCTV</b>	Closed Circuit Television
<b>CEPT</b>	Committee of European Posts and Telecommunications
<b>DTI</b>	Department of Trade and Industry
<b>DTELS</b>	formerly: The Directorate of Telecommunications
<b>EMC</b>	Electro Magnetic Compatibility
<b>EIA</b>	Electrical Industries Associations
<b>HO</b>	Home Office
<b>MPT</b>	Ministry of Posts and Telecommunications
<b>PABX</b>	Private Automatic Branch Exchange
<b>PCN</b>	Personal Communications Networks
<b>PNC</b>	Police National Computer
<b>PSTN</b>	Public Switched Telephone Network
<b>PTOs</b>	Public Telecommunications Operators
<b>QA</b>	Quality Assurance
<b>QS</b>	Quasi Synchronous
<b>UHF</b>	Ultra High Frequency
<b>VHF</b>	Very High Frequency

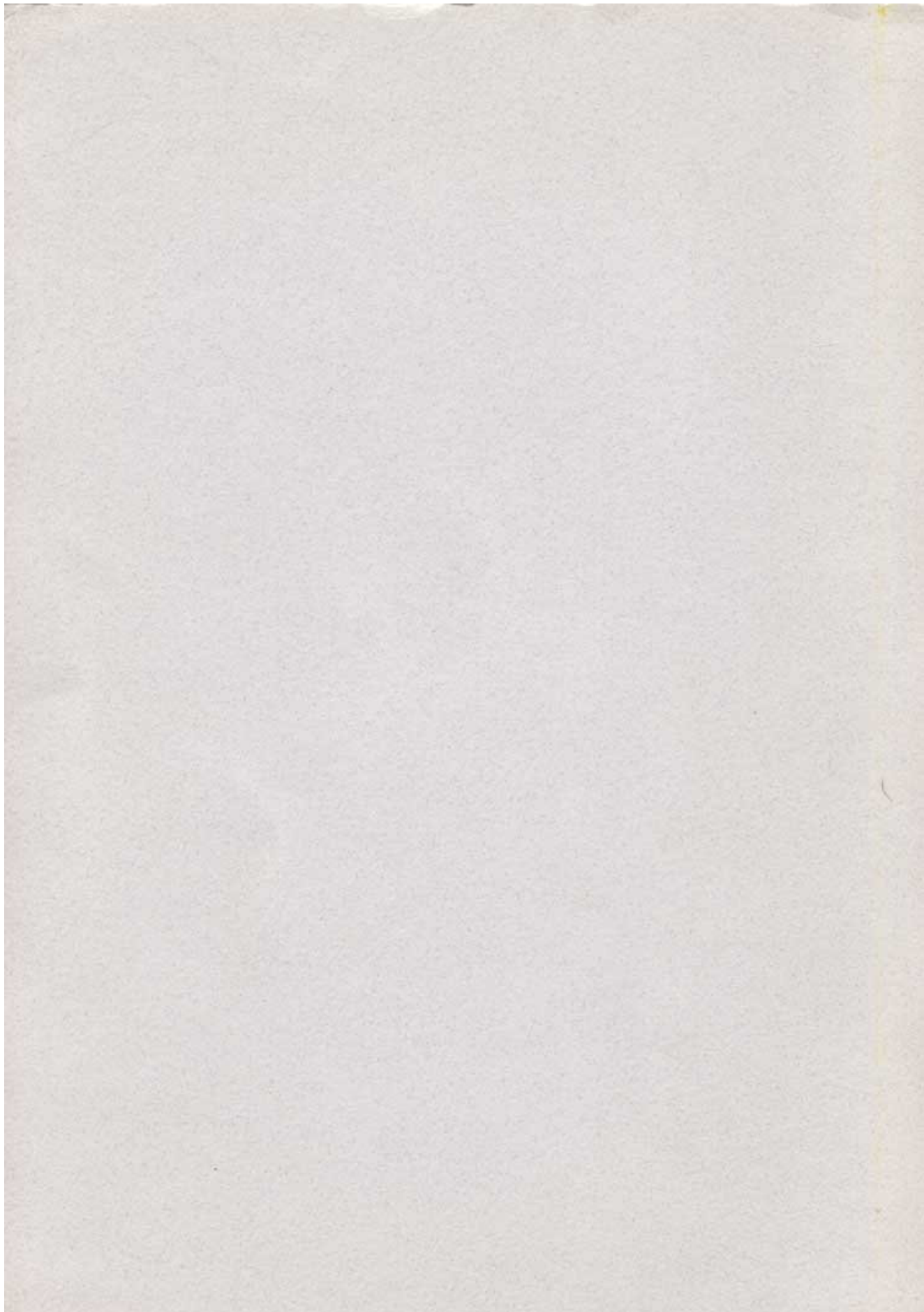


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