Delivering high-impact science and technology

Last year, we continued to deliver high-impact solutions to our defence and security customers, tackling both current and future challenges. Here is a small selection of some of our achievements that we can talk about.

**Cyber vulnerability investigations transition into MOD business as usual**

For the first time, Dstl is handing over a new operational cyber capability for Ministry of Defence (MOD) to assess the vulnerability of its assets to cyber attack, and to implement mitigations. The Cyber Vulnerability Investigation (CVI) method was developed and validated, in collaboration with wider Government, international partners and industry experts, through practical application to platforms, systems and facilities from across military and civilian domains. These investigations enabled the identification and management of active cyber risks and led to design changes in future platforms and current working practices. With Carrier Enabled Power Projection, we have completed our first high-level capability review of an entire task force. Dstl has shaped the formation of a standalone CVI Operations Cell in Joint Forces Command to discharge the service as business as usual for MOD, working with it to transfer our knowledge and expertise and de-risk its Initial Operating Capability. We have fostered external capability to meet the anticipated demand and are enabling MOD direct access to the industry base through our commercial frameworks to ensure a smooth transition to business as usual. This high-profile work was recognised through the Minister’s announcement of £265 million investment from MOD for this capability over the next 10 years.

**Supporting the criminal justice system**

Dstl’s Forensic Explosives Laboratory (FEL) supported the criminal justice system in a recent case. A Royal Marine reservist was jailed for 14 years for explosives and firearms offences, including stockpiling stolen guns and ammunition to sell on the black market. The case involved a number of submissions of explosive items during the course of the investigation. An FEL Senior Case Officer assisted the court process at the Old Bailey by providing multiple expert witness statements.

**Breakthrough on understanding the effect of blue light on bacteria**

Dstl has been working with Queen Elizabeth Hospital Birmingham to research the effects of blue light on bacteria as a method of killing or severely reducing levels of infection. From the hospital’s view, this could help fight against ‘killer hospital bugs’ but for defence it is hoped this method could be used to treat infected wounds and decontaminate healthcare environments.

The research has found that 34 different hospital-acquired infections could be killed or dramatically reduced by exposure to blue light between 15 to 30 minutes. The research into blue light was performed as part of the Dstl Research Scholarship Scheme, which enables our scientists, analysts and engineers to pursue their own, customer-related, ideas.
Introduction

I am pleased to introduce our Corporate Plan 2017–2022.

In April 2017, Dstl changed its organisational model within Government — from a Trading Fund to an Executive Agency. This brings some changes to the way in which we are owned and governed by MOD, bringing us more closely alongside other defence organisations. But it does not change what we do — which is to undertake and apply cutting-edge science and technology to keep UK Armed Forces, and the British people, protected from harm. There are some examples of how we do that published in this plan. There are many others that we cannot share openly because our work, rightly, needs to be kept secret from our adversaries.

We are proud of the direct support that we have given to the UK Armed Forces and other security organisations over the past decade or more, and continue to give today for current operations. To continue to do that successfully, and to be ready for future threats and conflicts, we seek to explore the potential of new technologies that emerge and how they might be used by our troops, or by our adversaries. Guided by MOD’s new Chief Scientific Adviser, we will continue to seek and research new technologies, such as quantum, autonomy, synthetic biology and directed energy, that represent potential game-changing opportunities. To do that, we seek to work closely with world-leading innovators within industry and academia, supporting their work and harnessing their expertise and ideas for defence and national security. We are delighted to be running, on behalf of Government, the new Defence and Security Accelerator as a key mechanism for stimulating and exploiting innovation.

Improving our ability to work with others — in industry, in universities and in partner nations — is a key thrust of this Corporate Plan. The plan outlines a number of programmes that, taken together, will continue to transform the organisation and equip us better to serve our broad range of customers. Our planned merger with the Home Office laboratory, CAST, is a significant step in the evolution of Dstl, bringing greater coherence and synergy to science and technology conducted for defence and national security. Most importantly, we will continue to invest in the skills and capabilities of our highly committed and expert workforce, and to play our part in the defence, security and prosperity of the UK.

Jonathan Lyle, Dstl Chief Executive
Our role and purpose

Dstl is an Executive Agency of MOD and provides solutions to the problems of defence and security by delivering high-impact science and technology (S&T). This is built upon many years of experience and knowledge at Dstl and its predecessor organisations. Our people remain at the heart of the UK’s defence and security capabilities, whether on operations today, or preparing for operations tomorrow.

Our people:
- understand and advise upon the wide range of threats we face today and those we may face in the future
- understand and advise upon the counters to these threats and how to deliver them within the UK’s defence and security capabilities
- understand and are actively connected to the supply chain, whether in academia, industry or across our allies’ communities, from where these counters will be provided
- understand today’s technology and the S&T that will drive future solutions.

As a Government organisation, Dstl is uniquely placed to understand both the current and the future threats and counter threats, and provide the best, innovative solutions to deal with these threats, using a range of internal and external expertise.

From April 2017, Dstl is no longer a Trading Fund but has remained an Executive Agency of MOD. We have a renewed purpose and role which emphasises our position and importance within the UK’s Defence and Security Enterprise. Our new role and purpose reflects the clear recommendations from both the Government Chief Scientific Adviser’s Science Capability Review and MOD’s quinquennial review of Dstl’s Executive Agency status. Commissioning the S&T Portfolio derived from the MOD S&T Strategy, reflecting the needs of many defence and security customers, is now led by our colleagues in MOD’s Defence Science and Technology (DST) Directorate under the guidance of MOD’s Chief Scientific Adviser and the direction of the Research, Technology and Innovation Board (RTIB). Our focus therefore, and the focus of this Corporate Plan, is to continue delivering S&T for the defence and security of the UK and to steward the necessary S&T capabilities, now and in the future, working with others wherever possible.

Our role

Delivering S&T for defence and security
- Maximising impact and value from the S&T Portfolio.
- Supplying specialist S&T services which must be done in Government.
- Providing expert and impartial advice, analysis and assurance.
- Integrating S&T delivered by industry, academia, wider Government and its allies.

Stewardship of defence and security S&T capabilities
- Ensuring the required capabilities are available now and in the future in line with the S&T Strategy.
- Bringing together the right people, relationships, infrastructure, knowledge and licences to practise.
- Maximising the effectiveness and efficiency of our S&T infrastructure and assets.
- Working with industry, academia, wider Government and its allies to access and build capability.

Our purpose

Delivering high-impact S&T for the UK’s defence, security and prosperity
The world continues to be complex, dangerous and unpredictable. Dstl has an important role in supporting the Government in tackling challenges to ensure the UK’s security.

The defence and security context

The National Security Strategy and Strategic Defence and Security Review 2015 (SDSR15) described fundamental changes to the world order, requiring all aspects of national security to be increasingly integrated. There are major shifts in economic and military power balances, and powerful non-state actors have emerged alongside traditional state actors. While globalisation and rapid advances in technology bring huge opportunities to the UK and its allies, they also increase the scale, diversity and complexity of the threats that we face. SDSR15 identifies four key challenges that result:

• increasing threat from terrorism, extremism and instability;
• resurgence of state based threats and intensifying wider state competition;
• impact of technology, especially cyber threats and wider technological developments;
• erosion of the rules-based international order, making it harder to build consensus and tackle global threats.

Our business context

The financial pressures across Government are well known and MOD has to achieve major efficiency savings across the department. We continue to support our customers in identifying ways for them to become more efficient. This is both through the use of novel technologies and techniques (such as autonomy), as well as through advice about their ways of working. Dstl continues to identify and deliver our own efficiency savings, improving our productivity wherever possible and increasing the amount of S&T delivered for each £1 spent by our customers. Over the past year, we have delivered efficiency savings of £7.65 million. During this period, we have seen a 10 per cent reduction in our income and can expect to see further reductions in the future as our customers’ budgets tighten. Therefore, we will look for opportunities to reduce our costs while sustaining our specialist estate, skills and knowledge – the importance of being efficient in all that we do has never been more critical.

The growing defence and security challenges that our nation faces can be met only if we become more innovative. Innovation means being open to radical ideas and including them in the ways we exploit S&T. Only in that way will we develop the equipment and capabilities that we need to deal with threats now and in the future. We recognise that the private sector, rather than Government, drives today’s rapid pace of technological advances. To achieve more innovation, SDSR15 announced the launch of the Defence Innovation Initiative and the establishment of a Defence and Security Accelerator.

Dstl will work ever more closely with the private sector in order to increase the adoption of innovative solutions into defence and security capabilities, fostering a culture of innovation across all areas of our business.

Building on the high-impact work we deliver to our security customers, the Permanent Secretaries of MOD and the Home Office announced in January 2017 that the Home Office’s Centre for

Dstl continues to improve the efficiency of the organisation, enabling us to address as many defence and security challenges as possible, within available resources.

1 Referenced to our Corporate Plan 2014-2019
The full integration of CAST into Dstl will create a stronger, combined organisation that will deliver high-impact solutions to crime and policing as well as to our existing defence and security customers.

Applied Science and Technology (CAST) would be integrating into Dstl. Bringing together the S&T capabilities that are critical for supporting crime and policing with Dstl’s existing capabilities represents an exciting opportunity for both organisations. We expect the integration to be completed by 2020.

This Corporate Plan reflects the extensive capital programme needed to sustain our specialist infrastructure. In particular, we are part way through a major change programme, known as Helios, to relocate our specialist facilities and the workforce who use them from Fort Halstead, Kent, to Porton Down, Wiltshire.

We have also to address the challenge of sustaining our access to key S&T capabilities, many of which are fragile, despite a reducing budget. Without immediate action, our ability to continue to deliver high-impact S&T across the breadth of areas in the five-to-ten year timeframe is increasingly challenging. Over the life of this Plan, we will develop new approaches to forming partnerships with other sources of expertise in industry, academia and allied countries. We will use these approaches and a proactive reshaping of our workforce to ensure that, through Dstl, our customers will continue to have access to the S&T capabilities they need.

We continue to balance the needs and aspirations of our business with the economic realities. Our key challenge going forward is sustaining our S&T capabilities through this.
Our vision, strategic objectives and corporate strategy

Our new Vision for 2022 describes in three sentences the characteristics of the Dstl we aspire to become during the lifetime of this Corporate Plan. We believe that this will enable us to succeed in our purpose and role and help us to deliver critical solutions to rapidly evolving defence and security challenges.

Our vision

We will be recognised and respected for the impact S&T has on the defence, security and prosperity of the UK. Working safely and easily with others from industry, academia and allies we will develop and deliver solutions with sustainably healthy defence and security S&T capabilities. Dstl will be an inclusive place to work with a strong team of engaged, impartial and motivated employees who understand how their work makes a difference.

To achieve this vision we have three strategic objectives:

Delivering high-impact S&T for defence and security

Continuing to deliver high-impact S&T for defence and security will help maintain the UK’s advantage over its adversaries and contribute to the broader UK economy. This is our heritage: it is something that we have always done. We need to continue delivering high-impact S&T for all our customers, and, in collaboration with our colleagues in DST, we must demonstrate the value of our work to all our stakeholders.

Stewardship of S&T capabilities for defence and security

We are charged by MOD to steward S&T capabilities – both inside Dstl and throughout the supply chain – so that the right capabilities are available now and in the future for the UK’s defence and security. Stewardship means taking responsibility for overseeing and protecting these S&T capabilities. This objective places a renewed emphasis on this activity – both for our internal capabilities, and for those in industry, universities and other partners.

Making Dstl a great place to work

Continuing to make Dstl a great place to work will help ensure that we have an engaged and motivated workforce that excels at delivering innovative and high-impact S&T. A key enabler is having a diverse workforce that feels listened-to and valued, and making sure that everyone feels able to contribute to the best of their abilities. Not only does this benefit Dstl’s delivery of S&T, but by making Dstl a great place to work, we become an organisation that is attractive to our customers, partners and suppliers. By investing in our estate we will keep our facilities up to date and attractive to our workforce and to potential future employees.

A representation of our vision
Our new corporate strategy: Working With Others

In delivering our Vision through the three strategic objectives, there is one issue that is fundamental to our future success – sustainment of S&T capabilities. The 2015 Science Capability Review highlighted the fragile nature of many of the S&T capabilities that are vital for current and future defence and security needs. These S&T capabilities, whether in Dstl or in the wider supply chain, are all needed to counter the rapidly evolving and increasing number of threats to the UK. The financial constraints across Government mean we cannot simply invest more Government resources to sustain these capabilities. We have recognised this and have developed a key strategy to address this challenge.

This strategy, that of ‘Working With Others’ seeks to build upon our past and present success and deliver a strategic shift in the way Dstl will work in the future. Dstl already has a wide range of partnerships that enable delivery and capability sustainment with others. The new strategy draws on best practice from across the organisation. A few examples of the types of approaches we will consider are shown below.
We expect ‘Working With Others’ to bring many benefits:

- **improved financial resilience** – working with others allows us to share the cost of stewarding S&T capabilities and delivery of high-impact solutions, through sharing facilities, training, and combining research and development activities of mutual interest
- **increased number of experienced people** – working with others provides access to a larger and more diverse pool of people with the knowledge, skills, and experience that can be used to provide solutions to defence and security challenges
- **improved exploitation** – working with others, particularly in industry, provides more direct links to those contracted to provide defence and security capabilities
- **improved career pathways** – working with others allows a varied career pathway for the many technical disciplines required across the S&T capabilities through the provision of interchanges and loans, shared recruitment activities and joint training and development opportunities
- **increased innovation** – while our people are highly creative and inventive, we recognise that new ideas and innovation increasingly emerge in the external supply chain. We must be able to harness and shape this to deliver better and alternative solutions for our customers.

The delivery of this strategy will be achieved through three key areas of development:

1. **Understand**

   When we have addressed this development area, we will have up-to-date knowledge across all of our S&T capabilities, particularly with respect to their health and capacity. We will understand what their key issues are and where we can work with others for mutual benefit. We will understand why others might want to work with us and what we have to offer. We will also understand all the available mechanisms for working with others at our disposal. We envisage that this phase will provide an initial output within six months. Our understanding will bring about a different way of working and it will become a standard part of everyone’s role within Dstl. Our understanding, combined with the new MOD S&T Strategy, will provide an opportunity to take a fresh look strategically across all our capabilities and reshape our workforce as necessary. We will produce an S&T Capability Stewardship Plan to bring all these parts together and then use this to guide our reshaping activities.

2. **Make easy**

   When we have addressed this development area, the critical enablers will be in place to make working with others simple and easy. Continued investment is required across our IT systems, infrastructure, and processes. Importantly, we will also have put in place a more effective Dstl-wide procurement capability.

3. **Embed**

   When we have addressed this development area, we will have embedded working with others as business as usual across the whole organisation. Our in-house capabilities will be appropriately sized and sustained in line with the S&T Strategy. We will be a commercially confident organisation where working with others is at the forefront of how we operate. We will all be proud of delivering with others – the culture will be that we always deliver with others and we do not think it different or too difficult.
The delivery of this Plan is structured against the three strategic objectives.

Delivering high-impact S&T for defence and security

First and foremost, we will deliver the new collection of S&T programmes for all of our defence and security customers. This new portfolio is designed to deliver the strategic direction from the Research Technology and Innovation Board (RTIB) of creating a more transformational S&T portfolio with a greater emphasis on using S&T to shape the future. There is a significant amount of work to be done to transition to this new portfolio, which consists of three types of programme:

- **Driving programmes** – seeking to shape the future of defence and security capability by focussing on those solutions that are disruptive or innovative in nature and that will deliver a revolutionary change
- **Responding programmes** – delivering directly to the planned capability Programmes of our customers, integrating S&T into specific areas that will deliver an evolutionary change to the defence and security capabilities
- **S&T services** – delivering specific outputs to our customers providing advice and support as necessary. Our critical support to operations capability is a key part of these programmes.

Dstl is also playing a leading role in innovation across the Defence and Security Enterprise. The Defence and Security Accelerator was announced in SDSR15 and is a key component of the Defence Innovation Initiative. Providing innovation as a service to Departments across Government, the Accelerator allows them to rapidly access innovation and new capabilities to address their defence and security needs. It will open up opportunities for suppliers who have never before worked with defence and security users, funding the development of selected innovative ideas, through both themed challenges and a wider enduring challenge. For more information visit the gov.uk Defence and Security Accelerator website.

We will also deliver the following internal programme to further improve the efficiency of our delivery:

**Sustainable Value For Money** – to increase our productivity, enabling continued investment in the capabilities needed to allow us to deliver our commitments. The programme includes improving our business processes, reducing overheads and taking a strategic look at our professional support functions.
Stewardship of S&T capabilities for defence and security

To understand our S&T capabilities better, we will deliver the following internal programmes that will enable the changes required to achieve the vision:

**Helios** – to relocate key facilities and our workforce from the leased Fort Halstead site to Porton Down in a controlled and responsible manner, in order to sustain vital S&T capabilities.

**CAST integration** – integration of CAST into Dstl in order to create a more resilient, sustainable and efficient set of S&T capabilities for users across defence and security. The integration will create a diverse and dynamic environment for S&T professionals to develop and innovate.

**Working With Others** – to deliver our new strategy of ‘Working With Others’ to steward our capabilities – this includes: addressing our organisation-wide procurement capability; the culture, skills and behaviours necessary; and, the key processes required both on and off-site. There will be an opportunity to take a fresh look strategically at our in-house capabilities and reshape them as necessary to be fit for purpose in the future. A S&T Capability Stewardship Plan will be produced to guide our reshaping in response to the many drivers to which we respond.

**Future Ways Of Working** – to design and implement new, modern ways of working within our estate that enable and encourage collaboration, partnerships, innovation and improved efficiency. It will apply across our office environment, laboratories, ranges and storage facilities at Porton Down and Portsdown West.

Making Dstl a great place to work

Building on our revised approach to engagement developed last year, we are focusing our efforts on ensuring four key enablers to optimum employee engagement are in place:

- having visible, empowering leadership which provides a strong strategic narrative about the organisation
- having engaged and engaging managers who focus on their people and give them scope, treat them as individuals, coach and stretch them
- having a strong employee voice throughout the organisation, where employees are seen as central to solutions
- having a strong matched culture, where the stated values are reflected in everyday behaviours from the top to the bottom.

Fundamentally, the overall aim of the strategy is to put engagement at the heart of everything we do.
Core to delivering this Corporate Plan is a strong financial plan. Our finances and their management are in line with the guidance set out in Managing Public Money, ensuring that our use of public funds is in the spirit of, as well as to the letter of the law; are in the public interest; adhere to high ethical standards; and, achieve value for money. Recent financial performance has been strong. However, our finances are finely balanced and require careful management. We face a period in which income is likely to decline yet we need to continue to invest in infrastructure, equipment and people to sustain and upgrade capabilities. The financial plan has been developed using the best information at the time of writing, both ours and those of our customers. We will review and revise this plan should circumstances change significantly during the year.

### Income

Our work is delivered to a wide variety of customers across MOD and wider Government.

- MOD’s core S&T Programme represents the largest proportion of our income. SDSR15 protected the S&T spend as a minimum of 1.2 per cent of the overall defence budget, a figure itself that is protected at a minimum of 2 per cent of the UK’s Gross Domestic Product (GDP).
- Defence Equipment and Support (DE&S) relies on our work to support it in procuring and maintaining the UK’s defence equipment. Much of the work we undertake for DE&S is delivered by our internal capabilities due to the nature of the requirements.
- Other MOD customers in the four Front Line Commands are becoming increasingly important customers for us. Our inputs into areas such as ‘Warfare in the Information Age’ have been influential as MOD looks to the future.

The demand for our work from wider Government and non-exchequer sources is expected to be at least sustained over the lifetime of this plan. We are an increasingly critical supplier to a number of wider Government customers who require in-Government S&T support on highly sensitive issues of national security. We will seek to increase our income in this area in order to sustain the increasing breadth of S&T capabilities needed for the future.

### Costs

Two thirds of our operating costs relate to our people. Our workforce is expected to continue to reduce over the lifetime of the Plan, representing a 15 per cent reduction in full time equivalents (FTE) since March 2013, including a 25 per cent reduction in professional support staff.

### Investment

Our capital investment continues to be dominated by our Helios programme in the early years of the Plan. Other key investments include the following essential areas:

- sustaining safety and regulatory compliance, which enables our licences to operate
- refreshing and modernising the existing estate in line with the aspirations of our customers and partners
- developing our IT networks, business systems and communications technology to reduce cost, facilitate improved ways of working and sustain resilience to cyber threats
- developing new capabilities to support future business and reduce further our operating costs.
Strategic risks

We place effective identification and control of risk at the heart of good decision-making. Our Corporate Risk Register enables the Executive and the Board to mitigate threats and exploit opportunities. We base our management of these risks on best practice, ensuring we are aligned with MOD’s Joint Services Publication 892 on Risk Management. We actively review the management of these risks at both Executive and Board level on a quarterly basis. The Corporate Risk Register contains two types of risk:

- Strategic risks that threaten (or enhance) the existence of Dstl and/or the defence and security of the UK.
- Operational risks that threaten (or enhance) the effective operation of Dstl.

Reflecting our role in the Defence and Security Enterprise, a number of these risks may have elements of control and mitigation that are owned and led by our colleagues in MOD’s DST, which complement those for which Dstl is responsible.

Key performance indicators

We monitor our performance on a monthly basis in order to advise the Dstl Executive and Board on current and future performance, so that appropriate and timely action can be taken to ensure we are on track to fulfil our purpose and role. Our performance is reported annually in our Annual Report and Accounts.

We have renewed our key performance indicators to align with our new role and purpose. The indicators we have selected are designed to demonstrate to our sponsor how well we are fulfilling our role. To ensure they remain fit for purpose we will review and refine our metrics and thresholds as we learn more about our new Executive Agency status and role.

Delivering S&T for defence and security

We will measure:
- how satisfied our customers are with our delivery against their requirements
- the performance of our programme delivery to time through programme milestones delivered, cost against programme budget and quality through technical review as agreed with DST
- the improvements in the efficiency of our delivery.

Stewardship of defence and security S&T capabilities

We will measure:
- the health of our S&T capabilities as agreed with DST
- how well our workforce is appropriately sized to deliver the S&T programmes efficiently, safely, securely and sustainably
- how well our unique and critical S&T infrastructure is utilised and how our funded capital investment plans deliver capability within budget.

Delivering MOD priorities

We will measure our support to MOD’s priorities including:
- Business improvement
- Support to operations
- Diversity and inclusion
- Support to wider Government
- Estate rationalisation
- Staff engagement
**S&T highlights**

**Successful demonstration of an unmanned vehicle command, control and data integration capability**

Dstl, QinetiQ, BAE Systems, Thales and SeeByte have built an unmanned vehicle command, control and data integration capability that was successfully demonstrated at the Unmanned Warrior 2016 event. The system comprises a suite of applications that run on the Royal Navy’s prototype Open Architecture Combat System, in much the same way that apps like ‘Facebook’ run on a modern smart phone and are capable of sharing data sourced from the different apps. This enables the system’s applications to integrate data sourced from a wide variety of unmanned vehicles, allowing the operators to command and control all of their assets from a single location, such as a warship’s Operations Room. It can also present unmanned vehicle sourced sensor data to the Royal Navy operators in their tactical picture, where it can be integrated with data from the ship’s own sensors and inorganic sources. During exercise, the system successfully integrated data sourced from 25 unmanned vehicles operated by 12 organisations, from six countries across all three maritime environments of air, surface and underwater.

**ADONIS model allows easy communications to support operations**

The ADONIS model, developed by a Dstl analyst embedded in Joint Force Air Component (JFAC), is used to rapidly assess the ability of a force to maintain an air presence given a specific location and force laydown. ADONIS visualises this output to allow easy communication between multiple planning teams. ADONIS is now routinely used to support the JFAC’s Commander while on operations/exercise. The NATO Air Command Evaluation Team raised the benefits of the ADONIS model as a highlight at the recent Joint Venture 2016 planning exercise.

**Successful demonstration of quantum gravity imager**

A quantum gravimeter, funded by the Disruptive Capability Gravity Imager Project, was successfully demonstrated outdoors in June 2016. Gravimeters measure local gravity; the quantum gravimeter uses cold atom technology to make quantitative measurements. Two adjacent gravimeters can measure the spatial gravity gradient and the world’s first portable cold atom quantum gravity gradiometer was demonstrated at Porton in December 2016. The sensors were designed and built by the University of Birmingham, working with and under contract from Dstl. Mathematical processing of the measured gradient signals will produce an ‘image’ easily understood by the operator. Software to achieve this is also being developed jointly by Dstl and the University of Birmingham and has been demonstrated using synthetic data. With its ability to detect underground/underwater structures, the gravity imager has a number of potential military applications, as well as civil applications, such as in water and mineral exploration and civil engineering. This portable quantum gravimeter is a first in the UK and world-leading.
Corporate Plan

2017 – 2022

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DSTL/DOC101278