

21世纪科技新视野丛书

New Horizons in The 21st Century's Science & Technology

(英汉对照读物)

◆丛书主编 吴文智 徐新

THE FUTURE Military Science

未来军事科学

◆ 高峰 张晓建 编译

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序

人类社会进入 21 世纪的今天,科学技术日新月异的发展速度真正地到了匪夷所思的程度。那些在过去常常被人们认为不可能的梦想,今天大多成了事实。如果将来有一天你突然发现汽车可以像飞机一样在大街小巷穿梭飞行,或当你在某个餐厅就餐时竟然发现你对面就坐着一个与你百分之百相象的你,请不要吃惊,因为这正是现代科学技术创造的结果。

科学探索是一项伟大的冒险活动,充满了刺激与振奋。它使人类的求知欲和好奇心得到满足,并且益发地激起人们愈来愈大的想像力,去欣赏和理解科学技术所带来的种种美妙与神奇。e 时代的到来更使人们对知识的力量不再有丝毫的怀疑,唯有对科学知识的需求更多地增添了紧迫感。“让科学知识为我们插上腾飞的双翅”成了我们绝大多数人潜意识的追求,正是在这样一种背景下,我们构想了这套《21 世纪科技新视野》丛书。意欲从浩瀚的科学海洋中撷取那些对我们明天的开拓进取富有启迪意义的新知识,奉献给一切热爱学习,热爱科学的人们。

《21 世纪科技新视野》是一套以英汉对照方式编排的“语言学习+科技知识”的“链接”式丛书。在编写过程中,所有参编者遵照“应用价值、文化价值、精神价值”相结合的原则精心选择每篇文章,努力把最能体现人类创造力与想像力的科学成果介绍给广大读者,所有原文均摘自英语国家的现版期刊或网络杂志。英文地道,原汁原味。内容讲求知识性、趣味性、通俗性、新颖性,

使得广大英语爱好者在学习英语的同时可以接受新科学知识的熏陶，也使那些钟爱新科学知识的人们在掌握新知识的同时得以强化和提高自己的英语水准，特别是与这个时代特点相融合的那些“与时俱进”的科技英语水准。这在加入 WTO 后的今天尤为重要，因为 WTO 已不容置疑地把每一个中国人深深地卷入到了全球一体化发展的新浪潮中。作为链接未来科学技术的知识纽带——《21 世纪科技新视野》丛书，将把我们与新科学和新知识紧紧地联接在一起，从而为广大读者打造出一个再次提升自己的知识平台，以便可以从容应对 WTO 时代扑面而来的任何挑战。

如果本丛书的出版发行确能使读者对我们的上述编写意图认同十之一二，那就是对我们所有编写人员的莫大奖赏。此外，本书得以顺利出版，除了我们所有编写人员的努力外，还折射了煤炭工业出版社决策者的创新意识和与时俱进的奋发精神，渗透了本丛书责任编辑的辛勤汗水。在此一并表示感谢。

对于书中可能存在的不足之处，我们将在下次再版时改进，敬请广大读者批评指正。

《21 世纪科技新视野》丛书编委会

2002 年元旦于南京

CONTENTS

目 录

Force XXI	2
21 世纪部队	
Night Vision Techniques and Equipment	14
夜视技术及其装备	
Military Application of Artificial Intelligence	24
人工智能在军事上的应用	
Information Technology In modern War	40
信息技术与现代战争	
Keeping Track	60
跟踪追击	
Unmanned Combat Air Vehicle	76
无人驾驶作战飞机	
Future Carrier Borne Aircraft	88
未来的舰载飞机	
On Target	104
瞄准目标	
Trends in the Development of Armored Vehicles	116
装甲车的发展趋势	

A soldier who has a video recon mission, for example, would have a video capture card plus a peripheral camera to take pictures for transmission to higher commands. The photos would provide location coordinates and azimuths via the Global Positioning System receiver and digital compass inside the radio/computer. This would provide improved operational intelligence, location information and battle-damage assessment.

假设有一名士兵前去执行摄影侦察任务，那么在他的系统中就应该装有一张摄影卡和一架外设的摄影机。这样他就可以一边摄影一边将图像发给自己上级。通过电台/电脑卡中配备的全球定位系统（GPS）接收仪和数字指南针，这些图像即可提供方位坐标和方位角等数据，这将对作战行动情报工作、战场方位信息以及战损评估提供很大的帮助。



Force XXI

Force XXI. The Army of 2000 and beyond.

It will require that everything be light weight and miniaturized, and that soldiers be fully integrated into a digitized battlefield.

And while it may not totally mimic the movie 2001, in which Hal the computer held unprogrammed conversations with people, it may not be far from it.

The first system designed to outfit and integrate a soldier into the battlefield as a complete fighting system will initially be fielded as early as 1998, according to officials at * the U. S. Army Soldier Systems Command in Natick, Mass¹. The command manages the countless design and development programs the venture entails.

Researchers at * the U. S. Army Communication and Electronic Command at Fort Monmouth, N. J. ², who are largely responsible for developing the individual soldier's computer and radio that will be the heart of the system, said nearly 5,000 Land Warrior system will be fielded by 1999.

* LW³ will be followed by a more elaborate soldier system that's expected to be fielded in the year 2003 as part of * the Generation II/21 CLW program⁴. And GEN II will be more compact, energy efficient, producible, affordable and survivable, and will be more easily integrated into the digitized battlefield.

As currently envisioned, the dismounted soldier system—every-

21 世纪部队

21 世纪部队,2000 年和未来的部队。

一切装备都要求做到小型化和轻型化,而且士兵要能完全适应数字化战场的需要,并与之融为一体。

在电影《2001》中,电脑哈尔已能与人进行不经程序安排的对话。21 世纪部队当然不会完全像电影里所演的那样,但可能已离此不远了。



据位于马萨诸塞州内提克的美国陆军士兵系统司令部的官员们说,最迟不晚于 1998 年,第一套完整的用于数字化战场的单兵作战系统将首次亮相。士兵系统司令部不仅承担大量的设计工作,还负责这项事业所必须的发展计划。

位于新泽西州蒙茅斯要塞的美国陆军通信与电子设备司令部,主要负责开发单兵作战系统的核心部件——计算机和电台。据这一部门的研究人员说,大约 5000 套“战地勇士”系统将于 1999 年前投入使用。

在 2003 年还会有一套更精密的单兵作战系统在“战地勇士”之后问世,这一系统是“第二代/21 世纪战地勇士”计划中的一部分。第二代战地勇士设计更小巧,耗能更少,生产更容易,造价更低,生存性更强,而且更容易适应数字化战场。

一套完整的单兵作战系统包括一名步兵在战场上所应穿戴和

1. The U. S. Army Soldier Systems Command in Natick, Mass. : 位于马萨诸塞州内提克的美国陆军士兵系统司令部,Mass. 为 Massachusetts 的缩写
2. The U. S. Army Communications and Electronic Command at Fort Monmouth, N. J. : 位于新泽西州蒙茅斯要塞的美国陆军通信与电子设备司令部,N. J. 为 New Jersey 的缩写
3. LW: Land Warrior, 战地勇士(单兵作战系统)
4. The Generation II/21CLW program: 第二代/21 世纪战地勇士计划, 21CLW 为 21st Century Land Warrior 的缩写



thing the infantry soldier will wear and carry on the battlefield—will include a high-tech helmet with a wide-field-of view image intensifier that will enhance a soldier's target recognition and acquisition capabilities.

Through the helmet, the soldier will experience enhanced night vision and be able to “see” around corners building via his weapon's thermal sight.

By scanning an area with his weapon's thermal sight, the soldier will be able to see an area's characteristics, including terrain and enemy positions, and will be able to see through obscurants. The thermal image will appear on miniature helmet-mounted display.

Another component of the dismounted soldier system will be an individual soldier radio/computer. In its GEN II version, the computer and radio will be combined and embedded in new web gear. The system will be built around a series of cards the size of credit card, but slightly thicker. One card will be his radio; another preformatted messages; and others would contain other applications.

A soldier who has a video recon mission, for example, would have a video capture card plus a peripheral camera to take pictures for transmission to higher commands. The photos would provide location coordinates and azimuths via the *Global Positioning System⁵ receiver and digital compass inside the radio/computer. This would provide improved operational intelligence, location information and battle-damage assessment.

A “pencil” camera developed for military use by *CECOM⁶ is being considered for inclusion in the helmet-mounted display.



携带的全部用具。正如人们所设想的那样,其中首先应该包括一个高科技头盔,头盔上配备的宽视野图像增强器,将提高士兵识别目标和捕捉目标的能力。

头盔将为士兵提供增强的夜视图像,而且通过武器上的热成像仪还能观察到角落和建筑物背后的情景。

通过热成像仪对某个地区的扫瞄,士兵能够看清该地区的基本情况,包括地形地貌和敌方阵地,甚至还能“看透”一些障碍物。热成像将被显示在头盔上的一小块屏幕上。

系统的另一个组成部分是单兵用电台/电脑。在第二代战地勇士系统中,电脑与电台将被整合嵌入一种新型连接装置中。系统的各个部件都是依照一系列电子卡片而制造的。这些卡片大小如信用卡一般,只是稍厚一些。其中一张就是电台,而另一张则储存有经过预先格式化的信息,其他的也各有各的用处。

假设有一名士兵前去执行照相侦察任务,那么在他的系统中就应该装有一张照相卡和一架外设的照相机。这样他就可以一边照相一边将图像发给自己的上级。通过电台/电脑卡中配备的全球定位系统(GPS)接收仪和数字指南针,这些图像即可提供方位坐标和方位角等数据,这将对作战行动情报工作、战场方位信息以及战损评估提供很大的帮助。

通信与电子设备司令部还在开发一种用于军事目的的“铅笔”照相机,并计划将其安装在头盔附带的显示屏上。

5. Global Positioning System: 全球定位系统

6. CECOM: (U. S. Army) Communications and Electronic Command: 通信与电子设备司令部



Also part of the soldier system is a protective subsystem that includes the new web gear, or load-bearing component; an assault pack; body armor to protect against small-arms fire; and an advanced battle-dress uniform. There is also an interface and power subsystem that links everything and keeps it going.

Individual portable power packs, possibly with form-fitting batteries that would be less obtrusive when worn as part of the soldier fighting harness, are being considered. Another possibility is development of a “sleep” mode that would automatically put the equipment on standby when not in use to conserve battery energy.

The modular soldier system can be task organized, and we can give every soldier what he needs and *hold back⁷ what he doesn’t need. Not everyone will need a video capture capability, for example.

The soldier will also include an objective individual combat weapon that would fire 5.56mm ammunition—the standard *M-16⁸ round—plus 20mm bursting munitions. The *OICW⁹ will have a thermal imager, laser range finder and digital compass to detect targets. If the soldier detects a targets at 1, 500 meters—500 meters beyond the weapon’s range—he can *hand over¹⁰ the target. This tells his computer, through preformatted messages, to send a call for fire to a particular location.

Other parts of the soldier system:

- Enhanced combat identification to protect from friendly fire, perhaps through a system of laser query and radio frequency response.
- A multipurpose individual munition/soldier assault weapon. It would launch projectiles into buildings, allowing destruction of rein-



在单兵作战系统中有一个子系统是专门起保护作用的,它包括一个新型连接板(或称为承载部)、一个突击背包、一副抗轻武器袭击的防弹盔甲,以及一件先进的战斗服。同样也有负责联系和提供动力的子系统,它们使系统中的各个部分能相互配合、协调运作。

研究者正在考虑开发一种独立的便携式能源包,这种能源包由穿在士兵身上作为铠甲部件的贴身电池组组成,该能源包还有“睡眠”功能——装备在不用的时候,自动转入待命状态,可节省电力。

这种模块化的单兵作战系统可根据不同的任务进行组装。因此我们可以对每名士兵实行按需分配,他不需要的部件尽可拿掉。比方说,并不是每个士兵都要有摄影侦察的能力。

单兵作战系统还将包括一个目标单兵战斗武器。这种武器可发射 M-16 步枪使用的标准型 5.56 毫米子弹,还可发射 20 毫米爆破弹。这种武器将配有用以探测目标的热成像仪、激光测距仪和数字指南针。如果有一名士兵在距自己 1,500 米的地方发现了一个目标,比单兵战斗武器的射程超出 500 米,他可以把实施攻击的任务交给其他人。具体地讲,他可以让电脑按照预先设定的信息格式向同伴发出一个向某一特定位置开火的请求。

单兵作战系统的其他组成部分和功能:

- 性能得到增强的战场敌我识别器,可保护士兵免遭友军误击。该识别器可能会采用一套激光问询和电台频率应答系统。
- 多功能个人军械/士兵突击武器。它能把射弹投射到建筑物中,还可摧毁经过加固的目标。

7 hold back:保有,扣留

8. M-16:口径为 5.56 毫米的美国陆军制式突击步枪(即 AR-15)

9 OICW:Objective Individual Combat Weapon 目标单兵战斗武器

10 hand over:移交、交出



forced targets.

- A mine-avoidance capability provided by computer algorithms and the thermal imager on the soldier's personal weapon. It will allow, the soldier to detect and avoid metallic and nonmetallic mines. It will also allow him to automatically pass location information through the digital network to higher headquarters so an engineer team could clear the mines, if necessary.

- A personal-status monitor that will measure five of the soldier's physiological functions. By measuring blood-oxygen levels, for example, the monitor will indicate how much blood a wound soldier is losing. With this and such other system as *GPS¹¹, higher headquarters could be alerted of the soldier's condition and location. And combat medics would be able to prioritize combat casualties, potentially saving more lives.

- A chemical-agent detector. Sensors would detect chemical agents, and algorithms in the soldier's computer would send warnings to his helmet display. The sensors would also warn higher commands to keep other friendly forces away from the contaminated area.

To avoid task duplication and the waste of crucial time, the Army's engineers and scientists are taking much of what they need for the near-term LW system * "off the shelf" ¹². That means they're using what's available commercially and adapting it for military use.

For 21 CLW, commercial advancements in telecommunications and microelectronics are being integrated into the system. The emphasis is on "hardening" all the electronics and the containers that house them, not only against potential enemy weapons, but to the effects of



· 使士兵具有免受地雷伤害的能力。因为依靠电脑运算和武器上的热成像仪,能使士兵探测到金属和非金属地雷的位置,并及时加以规避。它还允许士兵把雷区的方位信息通过数字化网络自动传递给上级指挥部门。在必要的情况下,后者会派出一支工兵分队前去排雷。

· 身体状况监测仪,可对士兵的 5 项生理功能进行检测。例如,通过测量血液中的氧含量,即可知道一个受伤士兵的失血量。有了这个监测仪和全球定位系统,指挥部门就能清楚地掌握受伤士兵的伤势和所处位置。战地救护队也可根据有关数据确定对伤员进行抢救的先后次序。这样,就有可能挽救更多的生命。

· 化学毒剂探测器。它的感应器一旦探测到化学毒剂的存在,电脑程序就会通过头盔显示屏向士兵发出警报。与此同时,它还会警告上级指挥部门,防止友军误入污染区。

为了节省宝贵的时间,避免任务重复,美国陆军的工程师和科学家们在开发战地勇士系统时都尽量采用已有的设备。也就是说,他们先寻找一些市面上现成的民用设备,然后再把它们改成军用。

目前,在电信和微电子方面的先进民用技术正被用于 21 世纪战地勇士系统的开发。开发的重点是如何加强、加固所有的电子部件和它们的载体,使它们不仅能抵抗敌方武器的攻击,还能经受住

11 GPS:Global Positioning System,全球定位系统

12. off the shelf:现货供应



severe weather and hard use. Engineers are working to miniaturize everything, making it lightweight, user friendly and low cost to ensure it performs reliably with relatively little maintenance.

This complicated undertaking involves the engineers and scientists at Army research and development centers, *U. S. Army Training and Doctrine Command¹³ battle labs and commercial contractors. It also includes individual soldiers, who actually test the concepts to verify their tactical feasibility, durability and comfort, among other things.

In May 1995, CECOM researchers were working on plans for digitizing communications for a battalion of *10th Mountain Division¹⁴ soldiers who participated in an advanced war fighting experiment at *the Joint Readiness Training Center at Fort Polk, La¹⁵, in November 1995. The results of the experiment provided more data about the next steps in developing the electronics and computer software for 21CLW.

Digitizing the soldier's communication capability has been challenging. Information is most difficult to digitize because the only communication capability infantry soldiers have now is what they carry on their backs. Today's advanced communication requires them to erect buildings, shelters and antennas.

Land-mobile radios, widely used by police, fire and rescue people, are being adapted and tested as candidates for the soldier system.

The Soldier Individual Protective Ensemble, four subsystems first discussed by Army researchers in late 1991, led to an advanced war fighting demonstration of those subsystems in 1992. In that demo, soldiers from *Fort Benning, Ga.¹⁶, tested the equipment in the field and identified parts that performed exceptionally well. Those are being