【3.10】

**3.10每日一篇 | 外刊精读**

**military** **acoustics**：All the right **noises**  
   
Focused beams of sound waves can knock **drones** out of the sky  
   
【1】As children everywhere are **delighted** to learn in science class,sound can **shatter** glass. Might it also be possible, then, to use acoustic waves to **disrupt** the **electromechanical** **sensors** that **drones** require to fly? To find out, four **engineering** students at the University of Toronto repurposed small car **speakers** to **cobble** together a **contraption** “for **blasting** a drone with sound”, as one of them, Michael Acquaviva, puts it. It worked in early tests, though only at close range. **drones** 50cm away wobbled. At 25cm, they **crashed**.  
   
【2】Come the spring of 2024, after the kit’s power supply was beefed up and the **speakers** were replaced with transducers **capable** of producing **ultrasonic** waves, the system was entered in a **counter**-drone competition held by Canada’s defence department. The team’s design tied for second prize, winning C$375,000 ($262,000). Its members **founded** a small **startup**, Prandtl Dynamics, that now plans to have a **prototype** the size of a carry-on **suitcase** **suitable** for **battlefield** use by June. The **desired** **initial** attack range is 100 metres. Panda Foreign Magazine Intensive Reading:Respect for Originality, Piracy Must Be Punished  
   
【3】Prandtl’s unique “soft kill” **sonic** **weapon** **exploits** **materials**’ **tendency** to **vibrate** when **exposed** to acoustic energy, especially if the sound waves match the material’s **resonant** **frequency**. Prandtl’s system, says Parth Mahendru, the firm’s boss, concentrates energy into a narrow acoustic “**laser**” that **disrupts**, among other things, the gyroscopes **drones** require for **stable** flight. To detect **drones** and aim the acoustic beam, the system records sound waves from **approaching** **drones** and uses a computer **costing** around C$30 to **crunch** data from a sky-scanning camera.  
   
【4】Prandtl hopes, perhaps **optimistically**, to **stretch** the range of its “Sound Matrix”, as **employees** refer to the kit, to roughly 150 metres. Many of the **tactical** jammers on the front in the war between Russia and Ukraine have an effective range of just 50 metres or so.Panda Foreign Magazine Intensive Reading:Respect for Originality, Piracy Must Be Punished  
   
【5】Crucially, many of the newer **drones** taking to the skies in that **conflict** are impervious to **conventional** **jamming** anyway. Some fly using internal-**navigation** systems that compare live video from an on-board camera with a preloaded **terrain** map, with **artificial** intelligence **selecting** targets. Others receive **commands** through unspooling **wire**. Both drone types would be **vulnerable**, at least in theory, to Prandtl’s acoustic attacks.  
   
【6】Prandtl is **compiling** a library of different acoustic waveforms that can take out a **variety** of types of small **drones**. Acoustic attacks effective against some 35 drone models have been worked out so far. In the process, Prandtl’s engineers are learning some **astonishing** tricks. By modulating a wave’s **amplitude** and other **characteristics**, the system can **interfere** with or even gain a measure of control over **specific** subsystems such as the **gimbal** or camera **shutter**. “We can blind the drone, or we can crash the drone,” says Mr Mahendru.  
   
【7】Prandtl is also designing a 4kg “**backpack**” model to protect foot **soldiers**. Anna Poletaeva, the firm’s chief **operating** officer, believes it can be **manufactured** for less than C$2,000. Inquiries are coming from America’s **armed** forces, Ukrainian defence **contractors** and others. But the company also **spies** a market for non-**military** environments, where **conventional** **jamming** is generally illegal. For **civilians** annoyed by **pesky** **drones**, disabling their cameras may be **preferable** to bringing them crashing down.

**①短语**：1.原文： To find out, four engineering students at the University of Toronto repurposed small car speakers to cobble together a contraption “for blasting a drone with sound”, as one of them, Michael Acquaviva, puts it.

## 词典：find out 发现，查明；揭露，发觉

例句：Police have not been able to **find out**who was responsible for the forgeries.

警察还未能发现谁是那些伪造案的元凶。

2.原文：Come the spring of 2024, after the kit’s power supply was beefed up and the speakers were replaced with transducers capable of producing ultrasonic waves, the system was entered in a counter-drone competition held by Canada’s defence department.

词典：**were replaced with 取而代之**

例句：Nervousness and fear **were replaced with**joy.

喜悦取代了紧张和恐惧。

3.原文：Prandtl hopes, perhaps optimistically, to stretch the range of its “Sound Matrix”, as employees refer to the kit, to roughly 150 metres.

词典：**refer to 指代；提及；查阅**

例句：They can also **refer to**pop culture and new cultural trends.

它们也可以指流行文化和新文化趋势。

4.原文：Many of the tactical jammers on the front in the war between Russia and Ukraine have an effective range of just 50 metres or so.

词典：**on the front 前线**

例句：In early 2020, Zhang worked as a medical worker in Shanghai to save lives and make wonderful achievements **on the front**.

2020年初，她作为医务工作者来到上海，在一线挽救生命，取得了辉煌的成就。

5.原文：Some fly using internal-navigation systems that compare live video from an on-board camera with a preloaded terrain map, with artificial intelligence selecting targets.

词典：**artificial intelligence 人工智能**

例句：Managers have learned to grapple with networking, **artificial intelligence**, computer-aided engineering and manufacturing.

管理人员已经学会如何去应付网络、人工智能、计算机辅助工程和制造等问题。

6.原文：Both drone types would be vulnerable, at least in theory, to Prandtl’s acoustic attacks.

词典：**at least 至少**

例句：We need **at least**24 hours' notice of cancellation.

如欲取消，请至少提前24小时告知。

7.原文：Prandtl is compiling a library of different acoustic waveforms that can take out a variety of types of small drones.

词典：**take out 拿出；去掉；扣除；击败，淘汰；开始，着手**

例句：Once dishes come, we **take out**our mobile phones and take photos instead of lifting our chopsticks.

一旦菜来了，我们就拿出手机拍照，而不是拿起筷子。

8.原文：Acoustic attacks effective against some 35 drone models have been worked out so far.

词典：**worked out 解决，计算出，锻炼**

例句：The details of the plan are still being **worked out**.

计划的细节还在制定中。

9.原文：By modulating a wave’s amplitude and other characteristics, the system can interfere with or even gain a measure of control over specific subsystems such as the gimbal or camera shutter.

词典：**such as 例如**

例句：The teacher notes reading errors **such as**mispronunciations.

老师提到阅读过程中类似发错音这样的错误。

10.原文：For civilians annoyed by pesky drones, disabling their cameras may be preferable to bringing them crashing down.

词典：**be preferable to 更可取，更好的选择，更优先的选择**

例句：The intent is to show how feedforward can often **be preferable to**feedback in day-to-day interactions.

目的是要告诉人们：在日常交互中，应该多使用前馈而不是反馈。

**②长难句**

1、原文：**Prandtl’s system**, **says Parth Mahendru**, the firm’s boss, **concentrates energy into a narrow acoustic “laser”** **that disrupts**, among other things, the gyroscopes drones require for stable flight.

2、分析：主句的结构为主（**Parth Mahendru**）谓（**says**）宾语从句（**Prandtl’s system concentrates energy into a narrow acoustic “laser”**），宾语从句省略了that，结构是主（**Prandtl’s system**）谓（**concentrates energy into**）宾（**a narrow acoustic “laser”**）。**that**引导定语从句，句子的结构是主（**laser**）谓（**disrupts**）

3.译文：**该公司老板帕斯·马亨德鲁（Parth Mahendru）表示，普朗特的系统将能量集中成一道狭窄的声波“激光”，能干扰无人机稳定飞行所需的陀螺仪等设备。**

1. 原文：**Some fly using internal-navigation systems** **that compare live video** from an on-board camera with a preloaded terrain map, with artificial intelligence selecting targets.
2. 分析：主句的结构为主（**Some fly**）谓（**using**）宾（**internal-navigation systems**），**that**引导定语从句，定语从句的结构是主（**internal-navigation systems**）谓（**compare**）宾（**live video**）。

3.译文：**一些无人机使用内部导航系统，该系统将机载摄像头拍摄的实时视频与预装的地形图进行比较，并由人工智能选择目标。**

**③写作技巧：1**. **Some** fly using internal-navigation systems that compare live video from an on-board camera with a preloaded terrain map, with artificial intelligence selecting targets. **Others** receive commands through unspooling wire.

**译文：一些无人机使用内部导航系统，该系统将机载摄像头拍摄的实时视频与预装的地形图进行比较，并由人工智能选择目标。另一些无人机则通过放线接收指令。**

**技巧：**“Some……，others……”这一结构用于对比或描述集合中不同部分的特点或行为。同义表达有On the one hand……，on the other hand；在写作时可进行同义替换。

**④背景知识：**

1.University of Toronto：多伦多大学。是位于加拿大安大略省省会多伦多的一所公立联邦制研究型大学，也是加拿大乃至全球最顶尖的学府之一。多伦多大学拥有三个校区，分别是：圣乔治校区（UTSG）：这是多伦多大学的主校区，位于多伦多市中心，地理位置优越，交通便利；士嘉堡校区（UTSC）：该校区位于多伦多的士嘉堡区，提供广泛的学术课程和研究机会；密西沙加校区（UTM）：位于多伦多西部的密西沙加市，以工程和商科等专业著称。此外，多伦多大学共由11个学院组成，包括各种专业学院和研究生院，为学生提供丰富的学术选择和研究机会。

**⑤段落大意：**

【1】多伦多大学的学生改装成功了一个用声音击落无人机的装置。

【2】该装置优化后十分成功，团队成立了普朗特动力（Prandtl Dynamics）公司。

【3】普朗特公司独特的“软杀伤”声波武器利用了材料在受到声波能量作用时倾向于振动的特性。

【4】普朗特公司希望将“声音矩阵”装置的作用范围扩大到大约150米。

【5】普朗特公司声波攻击影响可以对新型无人机产生影响。

【6】该系统可以让无人机摄像头失效，也可以让无人机坠毁。

【7】该系统的市场潜力巨大。