

## Cambridge University's collaboration with the Chinese military

### The Centre for Advanced Photonics and Electronics (CAPE)

CAPE describes itself as a “unique partnership between the University of Cambridge and a small group of international photonics and electronics companies...”<sup>1</sup> It is an application-focused centre which has produced dozens of patents for Cambridge and the centre’s industrial partners. CAPE also offers special funding awards for innovative new research proposed by researchers.<sup>2</sup> It has been described by Cambridge’s Pro-Vice-Chancellor for Enterprise, Professor Andy Neely, as a “great model to enable collaboration.”<sup>3</sup>

On its website, CAPE lists the Beijing Institute of Aerospace Control Devices (BIACD) 北京航天控制仪器研究所 as one of its partners, explaining how “BIACD is involved in the development of fibre optic sensors, satellite communication system and IoT system, used in Chinese smart grid as well as in petroleum, emergency communication and intellectual manufacturing [sic].”<sup>4</sup>

As its name suggests, BIACD is primarily known for its work in the aerospace sector. The name BIACD is in fact an alias, and the institute is more commonly known in Chinese as the 13<sup>th</sup> Institute 第十三研究所 of China Aerospace Science and Technology Corporation 中国航天科技集团 (CASC). BIACD’s identity is not immediately verifiable in English online, though it is easy to find using Mandarin. The US State Department includes the BIACD alias on a list of Chinese military companies.<sup>5</sup>

CASC is the main provider for China’s space programme and a leading state-owned military aerospace company. Its English-language website underlines the company’s military credentials:

“CASC is mainly engaged in the research, design, manufacture, test and launch of space products such as launch vehicle, satellite, manned spaceship, cargo spaceship, deep space explorer and space station as well as strategic and tactical missile systems. [...] Under the strategy of military-civil integration, CASC pays great attention to space technology applications such as satellite applications, information technology, new energy and materials, special space technology applications, and space biology. [...] Over the past decades, CASC has made outstanding contributions to the national economic and social development, national defense modernization and scientific and technical progress.”<sup>6</sup>

CASC is one of China’s leading manufacturers of military drones. For example, CASC’s Caihong/CH series 彩虹 (‘rainbow’) of drones includes what is reportedly China’s best-selling export model, the CH-4.<sup>7</sup>

Figure 1. Image to right shows a CH-4 drone. (Source: [https://en.wikipedia.org/wiki/CASC\\_Rainbow](https://en.wikipedia.org/wiki/CASC_Rainbow))



<sup>1</sup> <https://www.cape.eng.cam.ac.uk/cape>

<sup>2</sup> <https://www.cape.eng.cam.ac.uk/Activities/Acorn>

<sup>3</sup> [https://www.cape.eng.cam.ac.uk/system/files/documents/cape\\_summary\\_a4\\_3.pdf](https://www.cape.eng.cam.ac.uk/system/files/documents/cape_summary_a4_3.pdf)

<sup>4</sup> <https://www.cape.eng.cam.ac.uk/cape/partners>

<sup>5</sup> <https://2017-2021.state.gov/communist-chinese-military-companies-listed-under-e-o-13959-have-more-than-1100-subidiaries/>

<sup>6</sup> <https://archive.vn/x6N7l>

<sup>7</sup> See, for example <https://www.scmp.com/news/china/military/article/3165183/chinese-drones-demand-algeria-and-egypt-eye-orders-worlds> and <https://www.aljazeera.com/news/2023/1/24/how-china-became-the-worlds-leading-exporter-of-combat-drones>

BIACD's research on inertial measurement devices is critical to these military technologies and products, giving BIACD what its recruitment material calls an "irreplaceable position and role in the field of national defense".<sup>8</sup>

According to CAPE's Cambridge University website: "In the spirit of mutual learning, sincere cooperation, harmonious development, and win-win relationships, BIACD joins hands with the domestic and overseas counterparts and all sectors of society, to make unremitting efforts for the promotion of development and application of photoelectric sensing technology. [...] BIACD has dispatched more than 10 technical staff to CAPE to research."<sup>9</sup> There is no mention of BIACD's real name and affiliation or military work on CAPE's website or any of CAPE's promotional material.

CAPE's website states that two members of its steering committee are BIACD staff.<sup>10</sup> CAPE describes its steering committee as "the arbiter of every aspect of CAPE activity".<sup>11</sup> The two members are Professor Wei Wang 王巍 and Yating Zhang 张亚婷. A third BIACD staff, Dr Enyi Guan 管恩义, is listed as a CAPE researcher.

Professor Wang is a lifelong aerospace engineer well-known in China for his research on inertial measurement devices. From 2018 to early 2023 he served as a politician in China's National People's Congress 中华人民共和国全国人民代表大会, the country's 'rubberstamp' parliament.<sup>12</sup> Wang previously served in a leadership role at CASC itself, and worked at a high level with China's military, in the Inertial Technology Specialised Group 惯性科技专业组 of the People's Liberation Army's (PLA) General Armaments Department 中国人民解放军总装备部.<sup>13</sup>

Dr Guan, listed as a CAPE researcher, has previously worked on military research. One paper written in 2016 with researchers of similar background is entitled "Leader-follower coordination combat model with WSN-oriented data link" and is based on research into how to coordinate missile systems.<sup>14</sup> Guan's limited number of publications suggests that not all his work is open-source. In response to a Freedom of Information (FOI) request, Cambridge said "There are no BIACD staff *based at CAPE*."<sup>15</sup> (Emphasis added.)

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<sup>8</sup> <https://archive.vn/HadZx>

<sup>9</sup> <https://www.cape.eng.cam.ac.uk/cape/partners/biacd>

<sup>10</sup> <https://www.cape.eng.cam.ac.uk/people>

<sup>11</sup> <https://www.cape.eng.cam.ac.uk/cape/organisation/steering-committee>

<sup>12</sup> <https://archive.vn/8XPhI>

<sup>13</sup> <https://archive.vn/mXDil> and <https://archive.vn/NL6wo>

<sup>14</sup> <https://www.scopus.com/authid/detail.uri?authorId=57189628026>

<sup>15</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/FOI-about-BIACD-Letter.pdf>

In response to a FOI request, Cambridge provided a list of CAPE-BIACD projects (see figure 2), and stated that BIACD has contributed £2,090,000 towards the partnership with CAPE.<sup>16</sup>

Smart in-building Wireless system using Flexible digital Transmission technology (SWIFT) 2014-2018 Objective: Design of a Digital Distributed Antenna System (DDAS) for in-building wireless distribution system for multiple services, making use of existing infrastructure	Figure 2. CAPE-BIACD research projects. 'RFID' stands for Radio Frequency Identification. (Link: <a href="https://ukctransparency.org/wp-content/uploads/2023/09/FOI-about-BIACD-Letter.pdf">https://ukctransparency.org/wp-content/uploads/2023/09/FOI-about-BIACD-Letter.pdf</a> )
Distributed analyser assessment and reinforced FO cable development (DARFOcable) 2014-2015 Objective: Development of reinforced fibre optic cable for use in distributed fibre optic sensing technology based on Brillouin backscattering for structural health monitoring of critical infrastructure	
Semiconductor Laser Technology low-noise Opto-electronic oscillatoR (SCULPTOR) 2014-2018 Objective: To develop a prototype of an optimized structure for a low-noise, low-cost and energy efficient opto-electronic oscillator (OEO), based on directly modulated semiconductor DFB lasers	
RFID system Optimisation for smart manufacturing using Mobile rEader (ROME) 2018-2023 Objective: Develop RFID technologies with the potential to enable an RFID systems with mobile deployment for applications in large area, wide scale smart manufacturing and wellhouse management scenarios	

Cambridge also made clear in its response to the FOI request that it has been aware of the true nature of BIACD since the partnership was initiated in 2013: “Due diligence on BIACD membership, then known as Beijing Aerospace Times Optical-Electronic Co Ltd (ATOE), was performed by the University’s then International Strategy Office with assistance from the UKTI [UK Trade and Investment] representative in Beijing. The information held about this is the attached summary document prepared at the time for the CAPE Steering Committee.”<sup>17</sup>

Cambridge shared with UK-China Transparency this one-page ‘summary’ due diligence report on the matter from 2013, which UK-China Transparency has now published in full. It quotes UK Trade & Investment, part of HM Government and the predecessor department of the Department for International Trade, which assisted Cambridge with due diligence. UKTI told Cambridge:

“[BIACD] have confirmed they have both military and civil interests. They suggest that the split is roughly 60% military and 40% civil. However, they suggest that the military and civil businesses are completely independent with different technical and management teams. Although currently the smaller part of their activities the civil business, it has great potential to expand rapidly.”<sup>18</sup>

When contacted prior to the publication of UKCT’s report, Cambridge University stated that “No new projects with the Beijing Institute of Aerospace Control Devices (BIACD) have been approved since 2018. In light of this inactivity and following an internal review BIACD participation in CAPE will end on September 30 2023. [...] £1.2m unused funds are due to be returned to BIACD at the end of their participation, so the funding received is more accurately stated as £1m. [...] CAPE only worked with the civil part of BIACD. [...] All CAPE projects go through internal university due diligence processes and all projects with BIACD were reviewed for export control compliance before approval. All projects were for civilian application and none of the research was on military (or dual use) technologies.” Cambridge’s press office’s letter, excerpts of which appear here, has been published in full on UKCT’s website.<sup>19</sup>

*There is no suggestion of illegal activity on the part of the University of Cambridge, CAPE, or any of its affiliated staff.*

<sup>16</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/FOI-about-BIACD-Letter.pdf>

<sup>17</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/FOI-about-BIACD-Letter.pdf>

<sup>18</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/FOI-about-BIACD-Materials.pdf>

<sup>19</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/Cambridge-Press-Office-response.pdf>

## The Cambridge China Development Trust

The Cambridge China Development Trust (CCDT) is a registered charity closely connected to and based at the University of Cambridge and run by university members.<sup>20</sup> It operates the China Executive Leadership Programme 中国企业管理高级研修班 (CELP). Participants in the training programme have included senior leaders from China's state-owned arms companies.

CCDT does not publish the names of CELP participants. The Foreign, Commonwealth & Development Office (FCDO), historically involved with the CELP, has refused to release the names of participants in response to a Freedom of Information (FOI) request by UK-China Transparency's director. The information that the FCDO did release comprised details of CELP's sessions at the FCDO in 2017, 2018 and 2019.<sup>21</sup>

Nonetheless, a historic publicly available FOI release (marked 'sensitive') by the FCDO gives the names of Chinese participants in the CELP in 2017.<sup>22</sup> In addition, CELP's Chinese government partner agency has released some photographs of CELP.<sup>23</sup> The examples of participants below are based solely on a few higher-definition photographs including nametags, and the single FOI response naming participants from the FCDO.

Given that these limited sources have yielded four participants from China's military-industrial complex in just two years, it is likely that many more such individuals have taken part in CELP over the programme's nearly two decades of operation.

CELP's content programme has been equally difficult to establish. However, material released by the Chinese government about the three-week programme mentions days devoted to "Energy sources & engineering", "High tech innovation", and "University, industry & innovation".<sup>24</sup> CELP has also involved at least one trip to a leading physics research centre at Cambridge University, the Maxwell Centre.<sup>25</sup>

When contacted prior to the publication of UKCT's report, Cambridge stated that "The Cambridge China Development Trust is an independent charity, and the University of Cambridge has no role in its governance."<sup>26</sup>

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<sup>20</sup> <https://www.thetimes.co.uk/article/cambridge-fellows-tutor-beijing-elite-leadership-jesus-college-rfrc5pdz>

<sup>21</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/2020-FCDO-CELP-FOI.pdf>

<sup>22</sup> The 'sensitive' mark can be seen in the metadata of the downloaded file which is hosted at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/651285/FOI\\_0813-17\\_-\\_material.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/651285/FOI_0813-17_-_material.pdf) - UKCT has published the file at <https://ukctransparency.org/wp-content/uploads/2023/09/2017-FCDO-CELP-FOI.pdf>

<sup>23</sup> <https://archive.vn/1Ukbk>

<sup>24</sup> <https://archive.li/wPC7q>

<sup>25</sup> <https://gtr.ukri.org/projects?ref=ES%2FP010849%2F1>

<sup>26</sup> Email sent to UKCT

### Zhang Dongchen

Zhang Dongchen 张冬辰 took part in CELP in 2017, when he was serving as deputy general manager (equivalent to vice-CEO) of China Electronics Technology Group Corporation (CETC). Zhang was elevated to general manager the next year and is now one of China's space industry's leading figures.<sup>27</sup>

CETC was founded to provide electronics for the PLA. CETC is state-owned and is one of the PLA's biggest suppliers, employing tens of thousands of people.<sup>28</sup> It is involved in developing and supplying facial recognition technology (including via a subsidiary, Hikvision)<sup>29</sup>, intelligence and surveillance (including via a subsidiary, Zhenhua Data),<sup>30</sup> and so on – CETC is the PLA's most important provider of military electronics. Hikvision has by its own admission provided technological support to the CCP's campaign of ethnic cleansing in Xinjiang.<sup>31</sup>

Zhang's name is on the list provided by the FCDO.<sup>32</sup> Zhang is also pictured from the side, with a legible Mandarin name card, taking part in CELP in a photograph published by the Chinese government (see figure 1).



Figure 1. Zhang Dongchen taking part in CELP in 2017 (Source: <https://archive.vn/Abomq> )



<sup>27</sup> <https://zh.wikipedia.org/wiki/张冬辰>

<sup>28</sup> <https://unitracker.aspi.org.au/universities/china-electronics-technology-group-corporation/>

<sup>29</sup> <https://www.technologyreview.com/2022/06/22/1054586/hikvision-worlds-biggest-surveillance-company/>

<sup>30</sup> <https://www.abc.net.au/news/2020-09-14/chinese-data-leak-linked-to-military-names-australians/12656668>

<sup>31</sup> <https://www.axios.com/2023/04/17/hikvision-internal-review-xinjiang-contracts-uyghurs>

<sup>32</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/2017-FCDO-CELP-FOI.pdf>

### Xu Qiang

Xu Qiang 徐强 took part in CELP in 2016, when he was serving as deputy general manager (equivalent to vice-CEO) of China Aerospace Science and Technology Corporation (CASC). Xu was elevated to general manager in 2018.<sup>33</sup>

CASC is a state-owned company that is the main contractor for China's space programme and a supplier to the PLA, involved in the development and manufacture of satellites, military drones, missiles, rockets and so on.<sup>34</sup> (For more on CASC, see section on Cambridge's Centre for Advanced Photonics and Electronics).

Xu was pictured in the Foreign Office (front row, second from right) and is clearly recognisable in photographs of CELP 2016 released by the Chinese government (see below.). There are many images of Xu published online, and one is reproduced below.<sup>35</sup>



Figure 2. Xu took part in CELP in 2016. (Source: <https://archive.vn/MHkuK> )

<sup>33</sup> <https://archive.vn/cEjjJ>

<sup>34</sup> <https://unitracker.aspi.org.au/universities/china-aerospace-science-and-technology-corporation/>

<sup>35</sup> <https://archive.vn/94A11>

### Chen Shaoyang

Chen Shaoyang 陈少洋 took part in CELP in 2017, when he was deputy general manager (equivalent to vice-CEO) of Aero Engine Corporation of China (AECC).<sup>36</sup>

AECC is a state-owned company that is China's leading developer of military aircraft engines, claiming to have tens of thousands of employees.<sup>37</sup>

Chen's name is on the 2017 list provided by the FCDO.<sup>38</sup> Chen is also pictured from the side, with a legible Mandarin name card, taking part in CELP in a photograph published by the Chinese government (see picture right).



Figure 3. Chen Shaoyang taking part in CELP in 2017  
(Source: <https://archive.vn/Abomq> )



<sup>36</sup> <https://archive.vn/OBlwu>

<sup>37</sup> <https://unitracker.aspi.org.au/universities/aero-engine-corporation-of-china/>

<sup>38</sup> <https://ukctransparency.org/wp-content/uploads/2023/09/2017-FCDO-CELP-FOI.pdf>

### Cao Jianguo

Cao Jianguo 曹建国 took part in CELP in 2012, when he was deputy general manager (equivalent to vice-CEO) of China Aerospace Science & Industry Corporation (CASIC).<sup>39</sup> From 2017 until 2022, Cao also served on the Chinese Communist Party's Central Committee as one of 170-odd alternate members.<sup>40</sup>

CASIC is a state-owned company and one of China's main manufacturers and exporters of rockets and missile systems. It also claims to "play a key role in the Council on Science and Innovations of the Chinese-Russian Committee of Friendship".<sup>41</sup> CASIC is also involved in the production of new forms of weapons such as those based on laser technology.<sup>42</sup>

It was during Cao's tenure at CASIC that the company reportedly began to supply North Korea's missile programme – an early report on this was in fact published the same year that Cao took part in CELP.<sup>43</sup>

Cao's name is visible in photographs of CELP 2012 published by the Chinese government (see below).



Figure 4. Cao Jianguo taking part in CELP in 2012. (Source: <https://archive.vn/OmRzo> )

<sup>39</sup> <https://archive.vn/PdvQg>

<sup>40</sup> [https://en.wikipedia.org/wiki/19th\\_Central\\_Committee\\_of\\_the\\_Chinese\\_Communist\\_Party](https://en.wikipedia.org/wiki/19th_Central_Committee_of_the_Chinese_Communist_Party)

<sup>41</sup> <https://web.archive.org/web/20210418180944/http://www.casic.com/n189298/n189314/index.html>

<sup>42</sup>

[https://www.armyrecognition.com/weapons\\_defence\\_industry\\_military\\_technology\\_uk/china\\_displays\\_new\\_version\\_of\\_its\\_lw-30\\_mobile\\_laser\\_weapon\\_at\\_airshow\\_china\\_2022.html](https://www.armyrecognition.com/weapons_defence_industry_military_technology_uk/china_displays_new_version_of_its_lw-30_mobile_laser_weapon_at_airshow_china_2022.html)

<sup>43</sup> <https://www.nti.org/analysis/articles/north-koreas-procurement-network-strikes-again-examining-how-chinese-missile-hardware-ended-pyongyang/> for the 2012 report. See also <https://www.taipetimes.com/News/editorials/archives/2020/01/20/2003729540> and