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万物逢春 千帆竞发
-- 写在首届亚洲通航展之际

When the spring of the low-altitude economy comes --celebrating the first AERO Asia

用“忽如一夜春风来，千树万树梨花开”来形容现在低空经济产业的火热局面可能是再合适不过了。从去年以来，全国各地、各级政府、各部门陆续出台了若干低空经济鼓励政策。据不完全统计，截至目前全国已有 126 项低空经济相关政策，其中国务院及各部委发布 27 项，地方政府发布 99 项。这么大的促进力度，对我国传统通航来说可能是从未有过的。10 月，工信部、科技部、财政部、民航局联合印发的《绿色航空制造业发展纲要（2023–2035 年）》纲举目张；11 月，国家空中交通管理委员会办公室会同有关部门发布的《中华人民共和国空域管理条例（征求意见稿）》夯实基础。各地方政府中深圳尤为积极。深圳市人大常委会已将《深圳经济特区低空经济产业促进条例》作为今年的重点立法项目，这将是全国首部低空经济产业发展法规。深圳多个区也先后出台了真金实银的鼓励政策，投入亿级的扶持资金。行业的一个小高潮和标志性事件无疑是 10 月民航局为亿航的 EH216–S 电动垂直起降航空器（eVTOL）颁发了正常类适航证，这是全球第一个载人 eVTOL 和无人驾驶载人航空器的适航证，开创了历史。

按照国家低空经济融合创新研究中心的定义，低空经济是“以各种有人驾驶和无人驾驶航空器的各类低空飞行活动为牵引，辐射带动相关领域融合发展的综合性经济形态”。至于低空经济这种新的航空经济形态与传统通航的关系，该中心认为“通用航空是低空经济的主体产业，无人机是低空经济的主导产业，同时也是通用航空的主导产业”。

可见，传统通航与低空经济的各类新机型设计、新商业模式、新应用场景和新市场是相辅相成、互为依托的共生关系，而非相关排斥。简单化理解的话，也许可以认为低空经济就是传统通航为基础加上以智能飞控、无人机、新能源、电动航空、eVTOL、网联化融合运营等标志性技术为引领的航空技术创新或相关技术在航空领域的应用所带来的新局面新形势。

世界正在经历百年未有之大变局，传统通航也是如此，低空经济业态的形成就是这种技术变革所带来的结果。正如在经济、科技、国际关系等领域的变化对我们带来的挑战和机遇，新技术变革对我们的传统通航产业也是一个前所未有的挑战和机遇。一方面，我们传统通航的底子薄、基础弱，羸弱的身子骨能否消受得了新技术、新产品、新形势的“猛药”值得关注，另一方面，我们在新能源、自动化和人工智能、5G 和互联网、智能制造等领域的产业优势如果能通过低空经济这一介质与传统通航相结合，很可能将是我国传统通航的历史性发展机遇，这可能也正是低空经济的发展目标之一。

亚洲通航展经过多年的坎坷筹备，终于迎来了首届展会。作为这一历程的见证者，不禁感慨万千。亚洲通航展历经艰辛，而又恰逢其时，衷心祝愿展会能够在低空经济的春风中乘风而起，越办越好，成为展示低空经济发展成果的大舞台。也借此机会，诚邀大家明年 4 月前往德国参观亚洲通航展的姊妹展—第 30 届 AERO 通航展。我们珠海和腓得烈港见!

中文版主编

Please find the english Editorial pleae turn the magazine and look from the back at page 3.

Turn page e-flight-journal
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FLYING CHINA

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威力· 泰克（Willi Tacke）
《自由飞翔与通航》和《自由之翼》出版人之一，资深运动航空类爱好者，还出版有德文杂志 Flügel 和 WDFF 目录刊。拥有轻型运动飞机私照及教员证。

苟昕（Gou Xin）
固定翼私照飞行员，具有特技飞行资质和后三点式机型签注。喜爱休闲娱乐飞行，长期关注套材自制飞机、各类轻型飞机和特技飞机，对航空运动和私人飞行领域的发展有深刻认识。

贝提娜（Bettina Cosima Larrarte）
资深航空记者，Flügel 杂志创刊人之一，超过 27 年的航空杂志撰稿经验。1987 年至今取得私人飞行私照、悬挂滑翔机执照、滑翔伞执照。

马里奥· 博瑞克（Marino Boric）
毕业于航空工程专业，持有 PPL 和 CPL/IFR 执照，曾是军机飞行员。非常热爱家庭自制超轻型飞机。是 Flügel 和 Vol Moteur 杂志的资深记者，喜欢驾驶飞机到处旅游。

罗比· 贝尔（Robby Bayerl）
1992 年开始飞滑翔伞，接下来 10 年从事超轻型飞机飞行和教学。2002 年考取滑翔机执照，之后先后考取美国 LSA 执照、PPL 执照。德国 Flying Pages 公司特约记者，三轴类超轻型飞机试飞员。

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Vans 套材飞机公司面临经营困难

Vans Aircraft facing operation difficulty

全球销量最大的套材自制飞机 Van's Aircraft 的创始人 Richard VanGrunsven 表示，公司将进行经营性调整，以解决严重的现金流问题。Van 公司目前面临的挑战是在短时间内发生了一系列重大事件，大幅增加了成本，使正常库存水平翻了一番，交货速度减慢，导致现金流紧张到临界点。主要原因是疫情导致的供应链减慢、供应商提供的底漆问题以及激光切割零件的最新问题，而疫情期间 Vans 的销量大幅增加，使得这些问题被叠加放大，目前有 1800 多名客户受到交付影响。

Richard VanGrunsven, founder of Van's Aircraft, the world's largest manufacturer of homebuilt airplanes, has said the company will make operational adjustments to address serious cash flow issues. Van's current challenge is the result of a series of significant events in a short period of time, which have dramatically increased costs, doubled normal inventory levels, and slowed deliveries resulting in cash flow being strained to a critical point.

深圳发布低空经济产业促进条例草案修改稿

Shenzhen released modified draft of the promotional policy for low-altitude economy

10 月 10 日，深圳市人大常委会办公厅发布《深圳经济特区低空经济产业促进条例（草案修改一稿征求意见稿）》全文，深圳市人大常委会将制定《深圳经济特区低空经济产业促进条例》作为 2023 年立法重点项目。以立法助推低空经济产业“高飞”，而这也将是全国首部低空经济产业发展法规。《条例》共有九章 61 条，从明确基本原则、健全管理机制、统筹基础设施建设、优化飞行管理服务、拓宽产业应用领域、加强产业支持和技术创新、强化运营安全保障等方面重点作出规定，例如，以立法方式明确推动开通市内、城际、跨境等低空客货航线，支持探索在机场、铁路枢纽、港口枢纽、核心商务区等开展低空飞行联程接驳应用，推进低空飞行快速应急救援体系建设，推动低空文化园区、低空消费小镇、低空飞行营地等建设，发挥政府性基金的引导作用。

美国环保署发布含铅航空燃料的拟议调查结果

EAP published Proposed Finding on Leaded AvGas

In October, the U.S. Environmental Protection Agency (EPA) released its proposed findings on leaded aviation fuels, which do not call for an immediate ban on leaded aviation gasoline but are simply the first step needed for the agency to exercise its authority to address the sources of aviation lead contamination.The EPA's recommendations are specifically centered around protecting children's health.The General Aviation Manufacturers Association (GAMA) says it has been working with the FAA and industry partners to remove lead from aviation gasoline. Under GAMA's EAGLE (Eliminating Lead Emissions from Aviation Gasoline) initiative, it has demonstrated its commitment to phasing out 100LL in a safe and thoughtful manner.

10 月，美国环保署（EPA）发布了其关于含铅航空燃料的拟议调查结果，该调查结果并未要求立即禁止含铅航空汽油，只是该机构行使其权力以解决航空铅污染源所需的第一步。EPA 特别围绕保护儿童健康提出了建议，该机构指出，自 1980 年以来，美国空气中的铅含量下降了 99%，使用 100 号低铅航空汽油的通航飞机成为仅存的铅排放来源之一。美国通航制造商协会（GAMA）表示，一直在与美国联邦航空局和行业合作伙伴合作，致力于从航空汽油中去除铅。根据 GAMA 提出的 EAGLE（消除航空汽油铅排放）倡议，近几个月来展示了其以安全、深思熟虑的方式淘汰 100LL 的承诺。

海鸥 300 轻型水陆两栖飞机获颁型号合格证

CAAC issued type certificate to Seagull 300 amphibian airplane

CAAC issued the CCAR-23type certificate for the Seagull 300 amphibious aircraft on October 16th. Seagull 300 has single-pilot control system, the use of cantilevered upper wing, "ten" type tail, high single-engine, front three-point retractable landing gear, hull type layout.

民航局于 10 月 16 日为中国特种飞行器研究所海鸥 300 轻型水陆两栖飞机颁发了型号合格证 . 作为我国自主研发的水陆两栖飞机，特飞所 300 轻型水陆两栖飞机 2007 年申请型号合格证。海鸥 300 飞机是航空工业通飞研制的一款 CCAR-23 部轻型水陆两栖飞机，该机按单驾驶体制、双操纵设计，采用悬臂式中上机翼、"十" 字型尾翼、高置单发、前三点可收放式起落架、船身式布局形式。2013 年 7 月，海鸥 300 在漳河机场首飞成功。2021 年，海鸥 300 圆满完成尾旋试飞。2022 年，该机型圆满完成了科研试飞、表明符合性试飞、适航审定试飞和功能可靠性试飞全部飞行试验任务。

国家空管委发布无人机空管有关事项征求意见稿

The National Airspace Administrative Committee released the draft of airspace regulation rule for UAV

依据《无人驾驶航空器飞行管理暂行条例》，国家空中交通管理委员会办公室相关部门起草了《关于明确〈无人驾驶航空器飞行管理暂行条例〉空中交通管理有关事项的通知（征求意见稿）》，现委托民航局空管办面向社会公开征求意见，意见反馈截止时间为 2023 年 11 月 15 日。根据征求意见稿，《通知》主要内容一是关于管制空域，明确管制空域划设要求、临时增加管制空域程序、管制空域的地面警示标志设置等内容；二是关于飞行活动申请，明确飞行活动申请内容、常态飞行活动申请要求、特殊情形等内容；三是关于飞行前确认，明确空中交通管理机构进行飞行前确认的主要原则；四是关于行为规范，明确飞行前和飞行中需要注意的事项、小型无人驾驶航空器适飞空域飞行的限制、飞行信息通报要求等内容；五是关于适飞空域内的避让规则，明确在适飞空域内飞行的无人驾驶航空器应当如何进行避让；六是关于自备动力系统的飞行玩具，明确此类无人驾驶航空器不适用的相关规定。《通知》明确，管制空域内，无人驾驶航空器通常在划定的隔离空域内飞行。中、大型无人驾驶航空器因任务需要可以在划定的航线上飞行，但是通常不加入有人驾驶航空器的航路、航线飞行。

The relevant departments of the Office of the National Air Traffic Management Committee have drafted the Notice on Clarifying Matters Relating to Air Traffic Management of the Interim Regulations on the Flight Management of Unmanned Aerial Vehicles, which is entrusted to the Office of Air Traffic Management of the Civil Aviation Administration to openly solicit public opinions for the society.

国家空管委发布空域管理条件征求意见稿

The National Airspace Administrative Committee released the draft of airspace regulation rule

11 月 2 日，国家空中交通管理委员会办公室会同相关部门起草的《中华人民共和国空域管理条例（征求意见稿）》公布。《条例》内容共 11 章 77 条，概括分为三大部分。第一部分（第 1 章，共 8 条），主要明确立法目的、适用范围，阐述空域权属、空域管理机构、空域管理原则、空域用户、环境保护、奖励制度等问题。第二部分（第 2 至 9 章，共 60 条），主要对空域管理机构职责和空域分级分类、划设与调整、使用、评估、保障、战时和平时特殊情况下的空域管理和监督检查等作出规定。第三部分（第 10、11 章，共 9 条），主要明确法律责任和处理措施，以及《条例》适用的特殊规定和有关概念解释。《条例》征求意见稿将空域分为管制空域（A、B、C、D、E 类）和非管制空域（G、W 类）七个等级，按限制类型、使用用途等又分为空中禁区、空中限制区、空中危险区、空中保留区、航路航线、进出境点、等待空域、空中放油区、试飞空域、训练空域、防空识别区、临时空域等。意见反馈截止时间为 2023 年 12 月 03 日。

On November 2, the Regulations of the People's Republic of China on Airspace Management (Draft for Opinion), drafted by the Office of the National Air Traffic Management Committee in conjunction with relevant departments, was published. The Regulations consist of 11 chapters and 77 articles, summarized in three main parts.

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空客直升机测试采用人性化方式驾驶 eVTOL

Airbus Helicopters tested user-friendly ways to fly eVTOL

10 月 25 日，空中客车直升机宣布其 FlightLab 飞行实验室验证机已成功测试了电动飞行控制系统，为空客电动垂直起降飞行器（eVTOL）原型机 CityAirbus NextGen 配备新的人机交互界面（HMI）做准备，并表示这是通向新一代电动城市空中交通之路的重要里程碑。得益于电动飞行控制系统提供的增强辅助驾驶功能，飞行员的操作被大大简化。单根操纵杆取代了传统的三项操纵装置（周期、航向、总距杆）控制飞机的全向姿态，这在直升机领域内尚属首次。飞行员使用单根操纵杆就可以完成起飞和着陆、爬升、下降、加速、减速、转弯和进近等所有操作。单根操纵杆占用更小的空间，增强了飞行员的视野，并与改进后的人机交互界面结合，使用简化的显示屏，提供专为 eVTOL 定制的信息选择。

On October 25, Airbus Helicopters announced that its FlightLab has successfully tested an electric flight control system in preparation for the new human-machine interface (HMI) for the Airbus Electric Vertical Takeoff and Landing Vehicle (eVTOL) prototype, CityAirbus NextGen, stating that this is an important milestone on the road to a new generation of electric urban air transportation. Pilot operations are greatly simplified thanks to the enhanced piloting assistance provided by the electric flight control system.

御风未来 M1 原型机首飞

M1 eVTOL of Vertaxi made the first flight

On October 30th, Shanghai-based Vertaxi announced that the first flight of its 2-ton eVTOL prototype M1 was completed. the M1 adopts a lift+cruise configuration with 20 rotors, a maximum payload of 500 kilograms, and has 5 seats, with a cruising speed of 200km/h, and a designed range of 250km.

10 月 30 日，御风未来宣布其自主研发的 2 吨级 eVTOLM1 首架机在上海金山完成首飞。M1 首架机采用复合翼构型方案，有 20 个旋翼，最大载重 500 公斤，可乘坐 5 人，巡航速度 200 公里 / 小时，设计航程为 250 公里。御风未来于 2022 年 9 月对外正式发布了载人 eVTOL M1 设计方案，2023 年 3 月底 M1 首架机正式从工厂下线。于 2023 年 9 月正式开始首轮飞行测试。

合肥市对亿航提供价值 1 亿美元支持

Hefei city provides supports worth of $100 million to EHang

On October 18, EHang announced that it signed a strategic cooperation agreement with the Hefei Municipal Government in China to jointly build a low-altitude economy industrial ecology in Hefei city. EHang will participate in Hefei's comprehensive application demonstration project of unmanned systems, and start the regular operation of unmanned aerial vehicles in Luogang Central Park in Hefei. Luogang Central Park is committed to becoming the world's leading Urban Air Mobility (UAM) super-hub aerodrome. The Hefei Municipal Government plans to provide EHang with a total of $100 million worth of support, including coordinating or facilitating purchase orders for no less than 100 EH216-S eVTOL, as well as financial support.

10 月 18 日，亿航智能宣布与合肥市政府签署战略合作协议，在安徽省合肥市共同打造低空经济产业生态。亿航智能将参与合肥的全空间无人系统综合应用示范项目，在合肥的骆岗中央公园开启无人驾驶航空器的常态化运营。骆岗中央公园致力于成为全球领先的城市空中交通（UAM）超级枢纽航空港。合肥市政府计划为亿航智能提供总价值为 1 亿美元的各项支持，包括协调或促进不少于 100 架 EH216 系列无人驾驶航空器的采购订单，以及资金支持。亿航智能表示，具体支持的时间、金额和形式将以另外的最终协议为准。此外，亿航智能还表示合肥市政府将积极促进亿航智能开拓合肥当地文旅、应急、物流、消防等“低空 +”场景的应用与合作，并为亿航智能提供用地、基础设施建设、专项运营补贴等全方位支持，加快推进全空间无人体系的建设。亿航智能拟在合肥市设立华东区域总部，推动无人驾驶航空器在华东地区的生产、销售、运营，加速城市空中交通的落地。

Beta 向美国空军交付首架电动飞机

Beta delivered the first electric airplane to the US Air Force

10 月 26 日，美国 Beta Technologies 公司向美国空军的“敏捷至上”项目交付首架 Alia（阿莉雅）固定翼电动飞机原型机用于测试。这是该公司交付的首架飞机。该机被交付给佛罗里达的埃格林空军基地，美国空军第 413 中队将在那里使用该机进行飞行测试和训练。Beta 的飞行测试团队将与美国空军合作，试验这架六座电动飞机的军用场景，例如物资补给和人员运输。Beta 还将培训美国空军飞行员和技术人员操作和维护该机。为了本次交付，这架固定翼构型的阿莉雅原型机顺便完成了一次从佛蒙特州到佛罗里达 2000 英里（3200 公里）的转场飞行，共用时 16 天，飞越了美国 12 个州，沿途停靠了大约 20 个机场，使用 Beta 公司自建的几个多式联运充电站充电补能。

Beta Technologies delivered the first Alia fixed-wing electric aircraft prototype to the U.S. Air Force's Agility Prime program for testing. This is the first aircraft delivered by the company.For this delivery, the fixed-wing configuration of the Alia prototype completed a 2,000-mile (3,200-kilometer) cross-country flight from Vermont to Florida in 16 days.

小鹏汇天发布分体式飞行汽车新设计

XpengHTAero released new design of modular flying car

10 月 24 日，小鹏汇天在小鹏汽车“1024 科技日”上首次公开其在研的一款全新产品——“陆地航母”飞行汽车。该产品采用两分体构型设计，分为陆行体与飞行体两个部分，并可进行自动分离、结合。飞行体可实现垂直起降，满足低空飞行需求；陆行体可将飞行体完全收纳至车内并进行地面行驶。与此同时，小鹏汇天还公布了陆空一体式飞行汽车的最新造型设计，以及围绕产品安全的一系列技术研发成果。分体式飞行汽车的陆行体为 4–5 人座舱，搭载增程式混合动力系统，可为飞行体进行多次补能。整车采用三轴六轮汽车设计，可实现 6X6 全轮驱动及后轮转向，具备较好的承载能力和越野能力，被官方定义为陆行“母舰”。造型方面具有未来科技感的赛博机甲风格，整体采用凌厉干脆的线条和简洁平直的块面。飞行体部分为纯电动有人驾驶飞行器，可实现垂直起降和低空飞行；产品采取分布式电推进系统，满足单点失效安全要求；支持手动 / 自动两种驾驶模式，简单易操作，降低用户使用门槛；270° 的全景双人座舱，为用户提供更开阔的飞行视野。

On October 24th, XPengHTAero made public for the first time a new flying car designwhich adopts a two-part configuration designdivided into aground vehicle and a multicopper eVTOL. The ground vehicle can completely store the two-seat eVTOL into the trunk and drive on the road.

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Perfect choice for cross country, leisure flights and flight schools.

TECHNICAL DATA	
Wing span	8,4 m
Length	6,1 m
Height	2,4 m
Wing area	10,38 m^2
Max. TO weight	600 kg
Empty weight	325 kg
Luggage in wings	2 x 20 kg
Luggage behind seats	15 kg
Engine Rotax	912 ULS2
Stall speed	66 Km/h
Cruize speed	190/230 Km/h
Fuel	2 x 60 L

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峰飞发布 2 吨级无人驾驶航空器消防方案

Autoflight released the firefighting solution of 2-ton eVTOL

0 月 24 日，峰飞航空科技发布全球首个 2 吨级 eVTOL 智慧空中消防方案。“凯瑞鸥”eVTOL 在接到火情信息后迅速响应，垂直起飞后完成正向转换，以约 200 公里时速飞行，飞至坐标附近进行反向转换，以旋翼方式飞到起火点上方悬停，瞄准起火点，从空中投下灭火弹将火情扑灭，随后再次转换飞行飞离火场并返航。 凯瑞鸥消防版机型与目前市场上的消防无人机相比，在载重、航时、覆盖范围、飞行效率、灭火效率等方面有着重大突破。其最大起飞重量 2,000 公斤，采用纯电驱动，维护简单方便，维护成本低，可搭载 4 枚高性能灭火弹（100 公斤 / 枚），单枚灭火弹可灭火 200 平米，单次飞行灭火面积最高可达 800 平米。凯瑞鸥消防版机型搭载的高性能灭火弹（共 4 枚，100 公斤 / 枚），配备多重安全保险措施，可确保操作人员及飞行安全；灭火弹中装填的多功能环保灭火剂，稳定性好，可迅速高效扑灭 A/B/C/E/F 各类火情，且对土壤无毒无害无污染，对人体无刺激性、可 100% 降解蒸发。除了空中智慧消防应用之外，凯瑞鸥还可广泛应用于低空物流和紧急物资运输。根据“由物到人”的战略规划，峰飞也在越来越多的场景落地应用。

On October 24th,Autoflight released the world’s first 2-ton eVTOL firefighting solution.Compared with the current firefighting UAVs on the market, the “Carryall” Firefighting model of Autoflight has advantages in terms of payload, flight duration, coverage, flight efficiency, firefighting efficiency. With a maximum take-off weight of 2,000 kg and pure electric drive, it is easy, cheap and convenient to maintain. It can carry 4 high-performance fire extinguishing bombs (100 kg/bomb), and a single bomb can extinguish a fire of 200 square meters, and the fire extinguishing area of a single flight can reach up to 800 square meters.

10 月 24 日，日本 eVTOL 标杆企业 SkyDrive 公司宣布被日本经济产业省选中参与中小企业创新促进项目（SBIR Phase3）的 " 下一代空中交通领域 " 项目，由此获得经产省 124 亿日元（约 8266 万美元）的资金。SBIR 计划是日本政府的一项举措，旨在为研究解决社会挑战的先进技术的初创公司提供资助，该计划支持发展潜力大、对社会有积极影响的研发项目。此外，在 10 月的日本车展上，SkyDrive 还宣布与其投资人之一的铃木汽车公司结为研发合作伙伴。SD-5 双座 eVTOL 设计，将申请日本的适航审定，并计划在 2025 年的大阪世博会期间进行试运营，计划 2028 年取得日本适航证。

Skydrive 公司新获日本政府 8266 万美元投资

Skydrive received $82 million from the Japanese government

On October 24, SkyDrive, a Japanese eVTOL company, announced that it has been selected by the Ministry of Economy, Trade and Industry to participate in the “Next Generation Air Mobility” project of the Small and Medium-sized Enterprise Innovation Promotion Project (SBIR Phase 3), which has received 12.4 billion yen (about 82.66 million U.S. dollars) in funding from the Ministry of Economy, Trade and Industry.

四部门印发《绿色航空制造业发展纲要（2023-2035 年）》

Four administrations released the industry policy for green aviation development from 2023 to 2035

October 10, the Ministry of Industry and Information Technology, the Ministry of Science and Technology, the Ministry of Finance, the Civil Aviation Administration of China issued the “Green Aviation Manufacturing Industry Development Outline (2023-2035)”, which clearly put forward that by 2025, the energy-saving, emission reduction, and noise reduction performance of the domestically produced civil aircraft will be further improved, and the level of green manufacturing in aviation will be comprehensively improved, and the development of green aviation industry will have achieved milestones. By then domestic civil aircraft using sustainable aviation fuels will realize demonstration applications, electric aircraft will be put into commercial operation, electric vertical takeoff and landing aircraft (eVTOL) will realize operation, and the feasibility verification of key technologies for hydrogen aircraft will be completed.

10 月 10 日，工信部、科技部、财政部、中国民航局四部门印发的《绿色航空制造业发展纲要（2023-2035 年）》（工信部联重装〔2023〕181 号）正式发布，明确提出到 2025 年，国产民用飞机节能、减排、降噪性能进一步提高，航空绿色制造水平全面提升，绿色航空产业发展取得阶段性成果，安全有效的保障体系基本建成。使用可持续航空燃料的国产民用飞机实现示范应用，电动通航飞机投入商业应用，电动垂直起降航空器（eVTOL）实现试点运行，氢能源飞机关键技术完成可行性验证，绿色航空基础设施不断夯实，形成一批标准规范和技术公共服务平台，有效支撑绿色航空生产体系、运营体系建设。到 2035 年，建成具有完整性、先进性、安全性的绿色航空制造体系，新能源航空器成为发展主流，国产民用大飞机安全性、环保性、经济性、舒适性达到世界一流水平，以无人化、电动化、智能化为技术特征的新型通用航空装备实现商业化、规模化应用。

普惠与吉凯恩宇航为混动电推验证机开发子系统

Pratt Whitney and GKN worked on the hybrid electric demonstrator

9 月，2021 年 7 月，普惠加拿大公司与德哈维兰飞机公司宣布，合作研制哈德维兰公司的冲锋 8–100 型涡桨支线飞机进行混动电驱改装，计划 2022 年进行地面测试，2024 年首飞。该项目是加拿大联邦政府和魁北克省政府共同支持的 1.63 亿加元新能源交通投资的一部分。吉凯恩宇航公司（GKN Aerospace）与普惠加拿大公司（Pratt & Whitney Canada）签署协议，为基于“冲锋 8–100”型涡桨支线飞机研制的 RTX 混动电动验证机项目合作开发高压大功率电气线路互连系统（EWIS）。位于荷兰的吉凯恩宇航公司将负责该项目。设计阶段结束后，吉凯恩宇航公司将负责制造必要的硬件并安装到验证机上。普惠加拿大对 RTX 混动电推验证机的目标是与当今最先进的涡桨支线飞机相比，燃油效率提高 30% 并相应减少二氧化碳排放量。

Pratt & Whitney Canada and de Havilland Aircraft announced a partnership to develop a hybrid-electric retrofit of de Havilland's Dash 8-100 turboprop regional aircraft, with ground testing scheduled for 2022 and first flight in 2024. The project is part of a $163 million new energy transportation investment jointly supported by the Canadian federal and Quebec governments.

时的科技 E20 eVTOL 型号合格证申请获受理

The application for type certification of E20 eVTOL of TCab was accepted

10 月 30 日上午，上海时的科技有限公司（简称“时的科技”）宣布中国民用航空华东地区管理局于 10 月 27 日正式受理了公司自主研发的倾转旋翼载人电动垂直起降飞行器（eVTOL）E20 的型号适航审定申请，标志着项目工作迎来了新的里程碑。目前，时的科技已向局方推荐多位合格人员成为委任工程代表，时的科技将联合高校同局方一起共同推进 E20 eVTOL 项目的适航审定工作。E20 eVTOL 采用倾转旋翼构型，配备大直径低转速五叶桨，装备 6 台高功重比的 ENGINeUS ™赛峰智能电机，采用 800V 高压架构，采用独创的电池和机翼结构融合（Cell–To–Wing，CTW）设计，提高了安全性，提升结构效率，整机更加轻量化。作为一款纯电动载人飞行器，E20 最大航程可达 200 公里，巡航速度 260 公里每小时，最大巡航速度 320 公里每小时。E20 拥有传统飞机的固定机翼，同时配有 6 个旋翼，其中 4 个旋翼可倾转，2 个旋翼在起飞后锁桨，降低阻力。

Shanghai-based Tcab announced that the Eastern China Regional Office of CAAC formally accepted the application for type certification of the company's tilt-rotor manned electric vertical take-off and landing vehicle (eVTOL) E20 on October 27.

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2023 年法国布洛瓦航展——不止于超轻机

自从法国超轻机协会（FFPLUM）接管布卢瓦的传统超轻型航展以来，一切都变得有些 " 超轻 "。这是因为该协会严格确保遵守法国超轻机 525 公斤的重量限制。

位于法国布卢瓦的航展总是在八月底法国学校假期结束时举行。每年都有来自欧洲各地的超轻机飞行爱好者在此聚会。尽管法国 UL 协会 FFPLUM 因其严格的重量政策而在一些制造商和飞行员中引起争议，但有一点必须承认：该协会负责人知道如何举办一场正式的超轻型飞机派对--提供在法国允许作为超轻型飞机飞行的所有类型的飞行器

法国的超轻机共有六个类别：动力

2）悬挂三角翼滑翔机、

3）动力三角翼、

4) 自转旋翼机、

5) 热气球和

6) 超轻型直升机。

得益于良好的组织和协调，不同类型的飞行器一起飞行的效果比想象的要好。没有音乐就没有派对，因此今年协会还在晚上赞助了一场摇滚音乐会。不仅法国航空监管机构 DGAC 的负责人会来到布卢瓦，法国空军也到场了到场从超轻机爱好者中招募飞行员。对于热爱超轻机的飞行员来说，布卢瓦是一个盛大的节日，那些还没有去过那里的飞行员一定不虚此行。展会地点：布卢瓦的Breuil机场 (LFOQ)。明年的具体日期要等到法国政府确定明年的学校假期后才能确定。航展官网：www.mondialulm.fr/en/

Serge Present（G1 Aviation）和 Vincent Duqueine（Duc Helices）在交谈。

Aviation et Pilote 和 Flying Pages 的展台。

自转旋翼机的 100 周年：在欧洲，旋翼机是 超轻机展会中不可或缺的一部分。

Willi Tacke（右）与来自乌克兰的 AEROS 公司的 Alexander Voronin 交谈。对方介绍了他的新动力三角翼，翼面积仅为 9 平方米。

航展期间飞行员简报会于每天早上 8 点举行。

双座电动超轻机在布卢瓦的首飞。由于重量轻，尽管法国的重量限制仅为 525 公斤，但 Elektra Trainer 仍可以在法国飞行。

一场摇滚音乐会为晚会画上圆满的句号。

UL – 航展

今年，直升机制造商Dynali带来了令人印象深刻的飞行表演。

而像Alpi或JMB　Aircraft这样的固定翼飞机制造商也没有让自己被混为一谈。

复古 UL

在布卢瓦的部分赛道上，法国人正在耕耘过去：美国 Weedhopper 等机型已在全球销售了 1000 多架。在法国，它们中的一些仍在飞行。

DINGO – 来自捷克的便宜UL

开放座舱，易于安装，适用于小型拖车 – Marek Ivanov 和 Jan Jilek 的 Minimal-UL可以使用功率为 25 至 40 马力的发动机。凭借其快速套件设计，这两位捷克人希望让超轻机飞行再次变得简单且经济实惠。该机的总价为 12,204 欧元（不含税）。

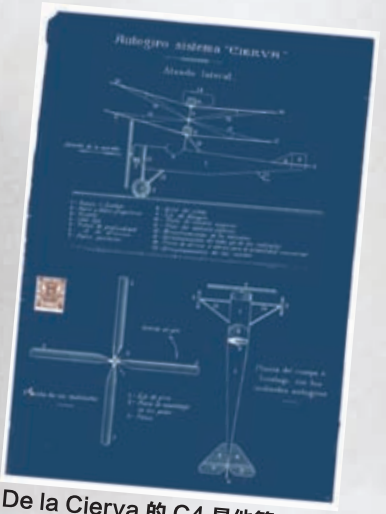
www.futurevehicles.eu

自转旋翼机诞生 100 周年

The 100-year anniversary of Gyrocopter

回到未来

Back to the future



De la Cierva 的 C4 是他第一个成功的自转旋翼机。他在第一次飞行之前就已经申请了专利。在第一次尝试时他还计划使用共轴旋翼。

100 年前，自转旋翼机（西班牙语：autogiro）首次飞行：1923 年 1 月 9 日，西班牙人胡安 – 德拉切尔瓦设计的 C4 首次起飞。然而，在经历了跌宕起伏、蓬勃发展和一系列事故之后，直到 20 世纪 90 年代末，自转旋翼机才得以在 UL/LSA 级中取得全球性的成功。

胡安–德拉切尔瓦于 1895 年 9 月 21 日出生于西班牙穆尔西亚。他 15 岁时开始制造双翼飞机，年轻时与两个朋友何塞–巴尔卡拉和巴勃罗–迪亚斯成立了一家名为 BCD（Barcala, Cierva and D í az）的公司，并很快推出了第一批机器。1917 年之前，de la Cierva 一直在学习土木工程。1918 年，BCD El Cangrejo 出现了，这是一架三发双翼飞机，能飞 6000 米高，时速超过 160 公里。飞机因飞行员失误坠毁后，设计师自己考取了飞行员执照。他意识到，驾驶固定翼飞机最大的危险之一就是在接近地面时失速。顺便说一句，失速后进入螺旋仍然是当今最常见的事故原因。

在寻找解决方案的过程中，西班牙人想出了在机翼上方安装自由旋转的旋翼。 1920 年，他有了第一个想法。当时已经有对旋翼机的开发，例如来自马略卡岛的佩雷　萨斯特雷　奥夫拉多尔（Pere Sastre Obrador），但由于缺乏资金，这些最初无法实现。 De la Cierva 于 1920 年为这一想法申请了专利，并注册了 Autogiro 商标。 他的专利说明书涉及一般旋翼机的设计，还描述了通过首先旋转旋翼来缩短起飞距离的可能性。　为了补偿引导和返回旋翼之间的不同升力，他的专利描述了共轴旋翼，但它不能正常工作。 C1 至 C3原型机都无法稳定飞行。 这种情况随着 1923

在英国获得认证的 Cavalon 旋翼机不仅具有自动驾驶仪，而且还被土耳其警方用于观察目的。

年旋翼连接头的发明而改变，de la Cierva 随后在他的 C4 中使用了该接头，并于同年获得了专利。 1923 年 1 月，C4 在四维恩托斯机场进行了稳定的飞行。 该机在 3 分 30 秒内完成了 4 公里的一圈飞行。 顺便说一句，最初安装在 Autogiro C4 上的旋翼接头仍然在所有直升机和旋翼机上几乎没有变化地使用。 在现代飞机中，桨叶根的弹性安装与更具弹性的桨叶相结合可达到相同的目的。 1925年，由于更好的经济支持，德拉西尔瓦移民到英国，并与苏格兰航空先驱和实业家詹姆斯 乔治 威尔创立了“Cierva Autogiro 公司”——顺便说一句，该公司一直存在到1975 年。 Cierva C8 的下一个版本现已开发完毕并在英国飞行。 最成功的型号无疑是 C30。 它不再有任何机翼，也没有副翼、方向舵和升降舵。 升力完全由旋翼产生，飞行员使用来自上方的控制杆移动旋翼进行控制。 C30 两座还有垂直起飞版本。 然而，要做到这一点，旋翼机需要旋翼总距调节和离合器来将旋翼与驱动器分离。 通过这种所谓的“跳跃起飞”，当旋翼攻角为负值以至于旋翼速度高于正常飞行速度时，旋翼就会预加速。 然后，驱动器断开，旋翼立即通过总距调整为正迎角。 突然的升力使飞机实际上蹦到空中。 然而，此时您必须立即加快前进速度并转动旋翼，使其由风驱动。 由于旋翼机没有尾桨或其他设计特征来抵消旋翼驱动的反作用力，因此在离开地面之前关闭

De la Cierva 的第一个设计：是一架固定翼飞机（1920 年）。

皮特凯恩 PCA-2 – Cierva 从美国获得许可生产。

胡安·德·拉西尔瓦（Juan de La Cierva）在他的一架旋翼机前。这位西班牙人不仅是旋翼机的设计师，也是他自己设计的试飞员。在上世纪 20 年代和 30 年代，他的设计不仅销往整个欧洲，而且销往世界各地——从日本到澳大利亚再到美国。1936 年，他在一架荷航 DC2 事故中丧生，年仅 41 岁。

驱动器以防止机身失控偏航非常重要。 在地面上，反作用力矩很小，因为没有升力，因此没有诱导阻力。机轮对地面的摩擦力和作用在方向舵上的螺旋桨推力足以补偿机身相对于旋翼的反扭矩。 允许调节总成的同一个杠杆通常也可以使驱动器和旋翼分离。 重要的是，旋翼中存储有足够的旋转能量，以便飞机在返回地面之前有时间加速到飞行速度。 起飞后，自转旋翼机不能继续垂直上升，而是必须开始向前移动。 即使是理论上可以垂直爬升的直升机，出于安全考虑，通常在垂直起飞后立即加速向前飞行，以便尽快摆脱所谓的“死亡曲线”飞行包线范围。

Cierva Autogiro De la Cierva 很快就带着他的产品开始了在世界各地的凯旋之旅。 1928 年，在一次轰动一时的飞越英吉利海峡之后，同年，与航空爱好者千万富翁哈罗德 弗雷德里克 皮特凯恩 (Harold Frederick Pitcairn) 一起创立了“Autogiro Co. OfAmerica”，不久之后他就开始在美国授权生产 Cierva 旋翼机。 Cierva Autogiro GmbH 于 1932 年在柏林成立。 在接下来的几年中直至 1938 年，Focke-Wulf 公司根据其许可总共制造了 43 架 C30 型旋翼机。 1934年，一架Cierva C30起飞并降落在巴黎市中心的街道上，参加“大皇宫”的航空展览会。 飞行是他的生命，但这也是 de la Cierva 的结束。1936 年，他在荷航定期航班失事中丧生，年仅 41 岁。 然而，他的合伙人继续经营公司。 除了旋翼机外，现在还开发和制造了飞机发动机。 然而，由

带短翼的旋翼机可以有更好的性能 。昨天：这是一架美国的皮特凯恩旋翼机。

阿米莉亚·埃尔哈特（Amelia Earhart）也驾驶旋翼机：她在 1931 年 4 月用这架旋翼机创造了世界纪录。

于第二次世界大战，旋翼机的时代似乎已经结束了。 Cierva 公司于 1938 年向英国皇家空军交付了最后一架型号为 C40 的旋翼机，从那时起就致力于生产需求量更大的直升机。 在获得许可建造 Cierva C30 后，Focke-Wulf 建造了世界上第一架适合日常使用的直升机，作为旋翼机 C61 的进一步发展：最终，这台机器也是基于 de la Cierva 的专利。 随着战争的爆发，更多的直升机成为当务之急，因为它们似乎是垂直升空的更好选择。 这就是 Cierva Autogiro 公司与直升机制造商 G. & J. Weir Ltd 于 1944 年成立的缘由，两者合并于格拉斯哥。 即将推出的型号现在在其型号名称中带有代表 Weir 的 W。 第二次世界大战结束后，仍然有个别尝试用旋翼机进入商业航空，但由于技术问题和市场上缺乏成功，这些都没有成功。 最引人注目的项目当然是 FB-1 和由 de la Cierva 的前总工程师 J. Bennett 代表 Fairy 公司开发的 Fairy Rotodyne。 其顶配版本最多可搭载 66 名乘客。 本质上，它还是自转旋翼机，其四叶旋翼在起飞时由旋翼尖端的小型喷气发动机驱动。 其目的是将人们从市中心带到通常位于郊区的机场 – eVTOL 空中出租车的开发商再次采用了这个想法。 Fairy已经在伦敦市中心规划并开发了第一个垂直机场，从这里可以快速到达伦敦的三个机场。 然而，噪音、成本和振动等技术问题导致该项目结束，并于 1962 年停止了商业旋翼机的开发。

带短翼的旋翼机可以有更好的性能 。昨天：这是一架美国的皮特凯恩旋翼机。

1934 年一架旋翼机在巴黎的大街上展示。

自转旋翼机的复兴来自飞行界的一个完全不同的角落：在美国，俄罗斯移民伊戈尔•本森（Igor Bensen）开发了一种廉价的旋翼机，最初可以拖在汽车后面，后来配备了小型发动机，以便可以自主飞行。 B7 是廉价飞机，旨在让每个人都能飞行。 本森将他的设计作为蓝图或套件出售。 到 1977 年，他已售出 4,000 架，其中约 2,000 架已完工并起飞。 20 世纪 60 年代，媒体帮助制造了真正的炒作。 肯•沃利斯随英国皇家空军巡演美国并发现了本森陀螺仪。 在英国本土，他对其进行了进一步发展，他的 Wallis 116 的伪装版本于 1967 年在詹姆斯•邦德电影《雷霆谷》中被用作“小内莉”而闻名于世。 但随着该机市场的繁荣，事故数量也随之增加，因为设计者们力求越来越大的发动机功率和更高的速度。 然而，这意味着通常训练有素的飞行员不知所措，特别是因为旋翼机的某些飞行条件也许对其他飞机是可以轻松控制的，但对于自转旋翼机来说可能是致命的。 负过载可能会因突然释放旋翼上的负载而毁坏飞机。 由于此时的大多数自转旋翼机（如本森）没有俯仰轴稳定器或水平稳定器，因此可能会发生所谓的飞行员引起的围绕俯仰轴的振荡，特别是在重型机型中，这通常会导致坠机。

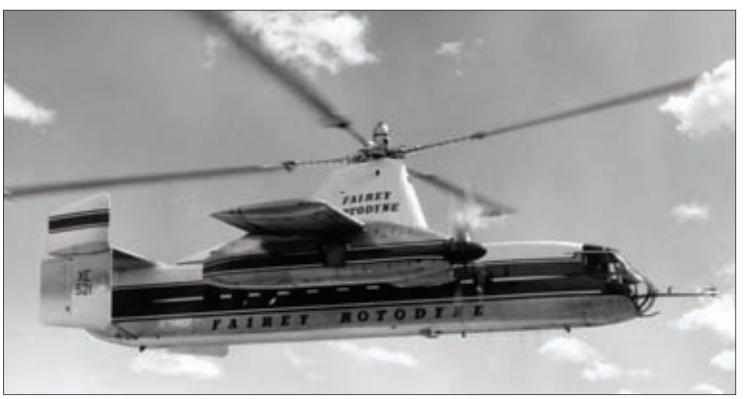
旋翼机还曾从船上起飞

C30 旋翼机驾驶舱内的 De la Cierva：操纵杆在上方。

另一家在大街上展示的旋翼机。这是来自荷兰的 PAL-V 自转旋翼机飞行汽车，可以在地面行驶。

结果，所有自转旋翼机在英国被暂时全面禁止，并在其他国家被贬为“杀人机器”。 英国航空当局在分析自转旋翼机事故时评估的主要原因之一是“飞行员培训不足或根本不存在，而且从未为这些飞机制定培训指南”。 当 20 世纪 80 年代末超轻型飞机在世界各地取得成功时，旋翼机的“冰河时代”才结束。 这也意味着 Rotax 的二冲程和四冲程发动机等特殊、更可靠的发动机是为新兴的 UL 行业开发的。 经过仔细分析，意大利人维托里奥 麦格尼等足智多谋的人为这些发动机补充了稳定的尾部装置和可靠的系列设计。他们还通过与意大利的飞行学校合作管理安全培训。紧随 Magni 之后，西班牙的 ELA Aviación 公司以及德国希尔德斯海姆的 Autogyro 公司也紧随其后。 这三人多年来一直主导着全球市场，过去十年中来自不同国家的许多其他参与者也加入其中。 与此同时，德国超轻型航空协会（DULV）等协会和其他权威机构制定了飞行员培训指南和飞机测试方法。 这意味着自转旋翼机的安全性不断提高，而像 Autogyro 这样的公司至少暂时是世界上 Rotax 飞机发动机最大的单一买家。 基于事故统计的改进和对旋翼机飞行动力学知识的不断增加，人们越来越多地努力在商业上开发旋翼机的特殊功能。 英国 CAA 已批准自转旋翼机，并且 EASA 已至少申请一项 UL 级以上自转旋翼机的适航审定申请，是来自荷兰的 PAL-V自转旋翼机飞行汽

美国卡特公司的旋翼机原型机可以垂直起飞。



Fairy Rotodyne：这是有史以来最大的自转旋翼机，在旋翼末端有喷气推进系统。

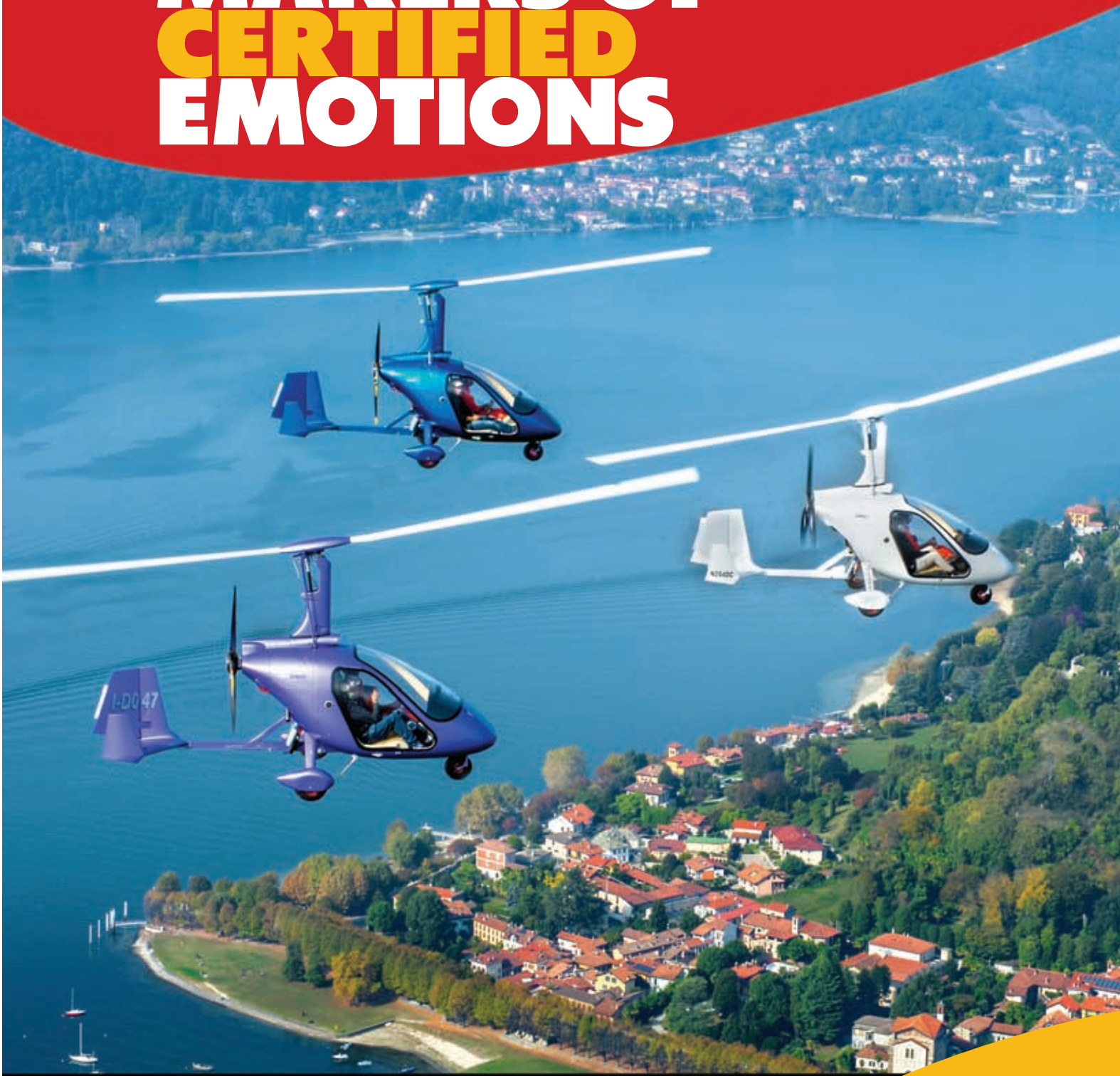
30 年代在费城的屋顶上“跳跃起飞”的旋翼机。

车，也可以上路行驶。 在美国，自转旋翼机几乎被排除在轻型运动飞机（LSA）类别的创立之外。 在 2000 年代初到中期，数据还很少，而在 FAA 制定新 LSA 类别规则的“旋翼专家”大多是直升机飞行员，他们对自转旋翼机并不太重视。 因此，在 LSA 规则中，不幸的是，旋翼机只能在“实验 LSA”类别中使用，简单来说，这意味着它们不能立即飞行，而只能作为套件出售。 与其他 LSA 飞行员相比，也存在一些限制。 Autogyro公司设法将自转旋翼机注册在“初级飞机”类别中，但必须投入大量时间和金钱才能做到这一点。 然而，现在很明显，根据目前美国立法程序中的新LSA规则，旋翼机也可以由整机制造商出售。 这意味着全球销售的自转旋翼机数量可能会继续增加。

自己造，然后飞走。通过广告 – 例如在“大众科学”杂志上 – Bensen 售出了 4000 多套旋翼机自制套材。

伊戈尔 · 本森（Igor Bensen）在 60 年代凭借其廉价的旋翼机自制套材引发了全球热潮，不过不少制造者在飞行中发生了事故。第一个 Bensen 旋翼机是被拖在汽车后面的绳子上的。

MAKERS OF CERTIFIED EMOTIONS



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画家兼作家劳拉·德拉西尔瓦（Laura de la Cierva）以艺术的方式设计了关于她曾祖父的作品。

Interview: Laura de la Cierva: Familytradition

访谈：LauradelaCierva：家庭传统

他是西班牙最早的飞机制造商之一，也被认为是直升机的共同发明者之一。但胡安·德拉·切尔瓦因发明自转旋翼机（也称为旋翼机）而永垂不朽。 他的曾孙女 Laura de la Cierva 是一位画家和作家，但同时对家族遗产“旋翼机”着迷。 在今年“旋翼机 100 周年”周年之际，她不仅从澳大利亚到美国参观了她曾祖父时代至今仍存在的自转旋翼机，还参观了当今许多 UL 自转旋翼机制造商。 这引发了与一位非凡的新 de la CiervaGyros 合作开展艺术项目的想法。 威尔·塔克在 Zoom 采访了劳拉·德拉·西尔瓦。

问：de la Cierva 女士，你了解你的曾祖父吗？ 从什么时候起旋翼机在您的生活中发挥了作用？

De la Cierva：当然，我的曾祖父和他的发明一直是家里的话题。 不久前，我和父亲一起在西班牙驾驶旋翼机。 六年多来，我一直致力于保护胡安的遗产。 我现在也正在完成自转旋翼机飞行员的培训。

问：你曾祖父研制自转旋翼机的动机是什么？

德拉谢尔瓦：早年作为飞机制造商，他就面临过低空失速事故。 他想开发一种不再可能发生典型“失速螺旋”事故的飞机。 他用旋翼机确实做到了这一点。 他的设计不仅稳定，而且从 1930 年开始，他还为他的 C30 旋翼机开发了垂直起飞选项。 他的专利对于直升机

参观现代超轻型旋翼机之父维托里奥·马格尼（Vittorio Magni）。

的发展也至关重要。 年仅 41 岁的他因空难去世时，仍然有很多计划。

问：你的曾祖父是一位开发飞机的工程师。 你是一位画家和作家。 但我们听说他们将来想再次生产旋翼机。 它们应该是什么样子？

De la Cierva：我们正在开发非常不同的车型，从小型、轻质开放式单座到碳纤维制成的两座。 我还创作了与 Juan de la Cierva 相关的图像并设计了旋翼机。 我们还组织了一场艺术展览，我参观并记录了世界各地留存的德拉谢尔瓦自转旋翼机。 我还在胡安的出生地穆尔西亚组织了以旋翼机为主题的研讨会和其他艺术活动。

问：回到新的自转旋翼机设计，您打算自己生产吗？ De la Cierva：目前，我们正在与专业人士以及感兴趣的业余团体一起开发来自不同设计师的自转旋翼机。 我们已经与欧洲众多希望支持我们的自转旋翼机制造商讨论了生产事宜。

问：您已经与哪些制造商交谈过？

De la Cierva：例如，我在意大利与 Vittorio Magni 一起工作，在保加利亚与 Niki Rotor 一起工作，当然也在西班牙与 ELA 一起工作。

问：我们听说您曾祖父在伦敦创立的英国公司Cierva Autogiro Company也计划重新生产自转旋翼机。 真的吗？

De la Cierva：是的，这是我们正在评估的选项之一。

问：202年自转旋翼机100周年纪念日之后，这些活动及其活动还会继续吗？

德拉西尔瓦：是的，当然！ 例如，我计划与我的团队一起在下一届 AERO航展上展出de la Cierva-Gyros。

问：我们一定会对此进行报道。我们感谢您接受采访并祝您继续取得成功。

旋翼机艺术展：劳拉在穆尔西亚的作品。

在穆尔西亚的学校研讨会

劳拉参观了世界各地仍然保存的许多 C30 旋翼机

参观保加利亚的 Nikki 旋翼机

Besnate 的最新型号是 M 26 Victor。

Interview: Vittorio Magni -A life for the gyrokopter

专访：Vittorio Magni 自转旋翼机的一生

自发明以来，自转旋翼机或旋翼机经历了许多风风雨雨。自 20 世纪 90 年代以来，旋翼机原理经历了最广泛的普及和专业应用，最初是在欧洲。 与快速崛起密不可分的是意大利人维托里奥·马格尼 (Vittorio Magni)，他通过有效的尾部装置使自转旋翼机变得更安全，安装了 Rotax 发动机并将其纳入 UL 级别。 威利·塔克 (Willi Tacke) 在法国布卢瓦举行的 UL 会议上庆祝“旋翼机 100 周年”之际，对这位出生于 1938 年的人进行了采访，他出生于自转旋翼机先驱胡安·德拉·西尔瓦斯 (Juan de la Ciervas) 去世两年后。

问：Vittorio，您第一次看到旋翼机是什么时候？您是如何接触旋翼机的？

Magni：从 1956 年开始，我就为直升机制造商阿古斯塔工作。 周末，我和朋友们一起制作了我的第一架旋翼机。

问：这是一个内部开发的垂直和水平尾翼单元，后来成为你们设计的典型吗？

Magni：不，那是带有木制旋翼的原始 Bensen 套件。 按照当时的惯例，我们最初将飞机拖在汽车后面飞行。 后来我们安装了大众汽车改装的水平对置发动机。

问：第一次自行设计是什么时候发生的？

麦格尼：在试飞过程中我们发现本森自转旋翼机不稳定。 我们尝试了各种我们自己的单座模型和发动机。 最初安装的 120 马力 Arrow 四缸发动

马格尼旋翼机也是从 bensen 旋翼机自制套材开始的。

机并不那么可靠。

问：接下来发生了什么？

Magni：我们设计的原型具有更大、更宽的旋翼，这也使得两座成为可能。 后来我们首先用铝制造旋翼，然后用复合材料制造转子。 我们花了很长时间才找到消除旋翼振动的方法。

问：制造旋翼机已经是你的全职工作了吗？

麦格尼：没有。 我从 1968 年起就在 Silvercraft 工作，开发同名直升机。 其他一些旋翼机设计来自美国。 但许多比本森更不稳定，因此也更危险，导致了许多事故。

问：飞行员引起的震颤是许多自转旋翼机事故的原因。 特别是如果没有配备稳定器并且发动机的推力轴明显高于整体重心。 De la Cierva 早在 1923 年就已经安装了垂直和水平稳定器。 为什么现代休闲自转旋翼机花了这么长时间才配备它们？

Magni：De la Cierva 出身于飞机制造行业，他的第一个自转旋翼机是经过改装的固定翼飞机，本来就有尾翼。 另一方面，本森希望为每个人开发一种廉价的飞机。 最初，他仅以拖曳模式驾驶作为滑翔机。 后来又出现了小型且相应较弱的发动机。 后来的设计师只是增加了发动机的功率以飞得更快。 再加上没有水平尾翼的装置的不稳定性，这增加了推力矢量的负面影响以及由于飞行员引起的震荡而对旋翼产生负过载的风险。 这导致事故数量增加，并导致在一些国家（例如英国）完全禁止使用自转旋翼机。

问：1974年，你们获得了芬兰自转旋翼机JT 5的产权。但麦格尼什么时候开始生产自己的自转旋翼机呢？

Magni：VPN 公司成立于 1986 年，为阿古斯塔等其他航空制造商生产复合材料零件。 他们还推出了第一批旋翼机，例如 MT 5 和 MT 7，它们基于 JT 5 但进行了重大修改。

问：MagniGyro 公司存在多久了？

Magni：1996 年，公司更名为 MagniGyro。 我们也是第一个使用 Rotax 发动机的公司。 最初有二冲程发动机，但后来当然也有四冲程发动机，直到顶级型号 915。916 很快就会跟进，因为双座可以使用大动力，而涡轮增压在以下情况下会有所帮助：在较高海拔处使用。 今天的型号包括 M 16 Trainer（双座串联，开放式）、M 22 Voyager（双座串联，开放式）、M 24 Orion（双座并排配置，封闭式）和 M 26 Victor（两人座串联，封闭）。

问：你现在还飞旋翼机吗？

Magni：不，可惜我不再飞了。 我现在已经85岁了，手部有些问题。

问：MagniGyro 公司现在有多大？

威利·塔克（左）在布卢瓦采访维托里奥·马格尼和他的儿子卢卡。

维托里奥·马格尼（Vittorio Magni）也是他自己的试飞员——这里是他 80 年代在 MT 5 型旋翼机里。

在过去的近 30 年中，Magnis 制造了 1400 多架旋翼机。

Magni：我们是一家拥有 26 名员工的家族企业。 我的儿子卢卡 (Luca) 接管了管理层，许多员工已经在我们这里工作了很多年甚至几十年。 我们每年生产 70 到 100架自转旋翼机。 我们自己制造许多零件，包括旋翼。到 2023 年，我们的旋翼机产量将突破 1,400 架，而且全球需求正在增长。

问：Magni 先生，我们感谢您接受采访并祝您继续取得成功。

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Ehang EH216-S:
World's first eVTOL with CAAC type certificate

China-eVents

AERO Asia in Zhuhai & e-flight-forum Kunshan

Infinitus:

e-Trainer from down under

Rx4e:

Part 23 electric aircraft in CAAC certification process

When the spring of the low-altitude economy comes - -celebrating the first AERO Asia

"Suddenly like a spring breeze coming overnight, thousands of pear trees bloom " may be the most appropriate way to describe the current hot situation of the low-altitude economy in China. Since last year, many regions, governments at all levels and various government departments have successively introduced various industry policies to develop low-altitude economy. According to incomplete statistics, there have been 126 policies related to the low-altitude economy across China so far of which 27 have been issued by the central government, and 99 have been issued by local governments. Such large-scale promotional effort may have never been seen for traditional general aviation in China. In October, the Ministry of Industry and Information Technology, the Ministry of Science and Technology, the Ministry of Finance, and the Civil Aviation Administration jointly issued the outline of the "Green Aviation Manufacturing Development Outline (2023-2035)"; in November, the Office of the National Air Traffic Management Commission, together with relevant departments, issued the draft of the "Airspace Management Regulations" lays a solid foundation. Among local governments, Shenzhen is particularly active. The Shenzhen city has designated the "The Regulation for Low-altitude Economy Industry " as a key legislation this year which will be the country's first industry policy for low-altitude economy set by law. Many districts in Shenzhen have introduced real-money incentive policies and invested hundreds of millions fund. A small climax and landmark event in the industry was undoubtedly the Civil Aviation Administration of China's issuance of a normal airworthiness certificate for EHang 's EH 216- S electric vertical takeoff and landing aircraft (eVTOL) in October by making history as the world 's first type certificate issued to a passenger-carrying eVTOL and to an uncrewed passenger-carrying aircraft of any type.

According to the definition of the National Low-altitude Economy Integration Innovation Research Center, the low-altitude economy is "a comprehensive economic form driven by various low-altitude flight activities of various manned and unmanned aircraft and radiating to drive the integrated development of related fields." As for the relationship between the low-altitude economy and traditional general aviation, the center believes that "general aviation is the pillar segment of the low-altitude economy, while UAVs are the spearheading segment of the low-altitude economy as well as the spearheading segment of general aviation. " It can be seen that the new aircraft designs, new business models, new use cases and new markets of low-altitude economy and traditional general aviation are complementary and mutually dependent symbiotic relationships, rather than mutually exclusive. To understand it simply, it may be thought that the low-altitude economy is based on traditional general aviation in addition to aviation technology innovation led by key technologies including intelligent flight control, UAV, renewable energy, electric aviation, eVTOL, and network-integrated operations.

The world is undergoing dynamic changes unseen in centuries, and the same is true for traditional general aviation. The formation of low-altitude economy is the reflection of this technological change. Just as changes in the fields of economy, technology, international relations have brought us challenges and opportunities, new technological changes have also brought unprecedented challenges and opportunities to the traditional general aviation industry. On the one hand, traditional general aviation has a weak foundation in China, and whether the “weak body” could withstand the "strong medicine" of new technologies, new products, and new situations deserves attention. On the other hand, China has advantages in renewable energy, automation, artificial intelligence, 5G, Internet, smart manufacturing. If these industrial advantages could be converged with traditional general aviation through the medium of the low-altitude economy, it could create a historic development opportunity for China's general aviation, which may also be one of the goals of the low-altitude economy.

AERO Asia finally ushered in its first show. As a witness to this process, I can’t help but be filled with emotion. The planning of AERO Asia has gone through many hardships, but it comes at the right time. I sincerely hope that AERO Asia can ride on the spring breeze of the low-altitude economy and become a stage to showcase the development achievements of the low-altitude economy in the future. I would also like to take this opportunity to sincerely invite you to visit the 30th AERO Expo, the sister show of AERO Asia, in Friedrichshafen, Germany in April next year. See you in Zhuhai and in Friedrichshafen!

Xin Guo

Please find the english Content page on page 4 from the Flying China side

Dubai Airshow 2023:

It's Electric !

This edition of one of the largest airshows worldwide turned decidedly electric. Even if Airbus, Boeing, and the other traditional aircraft manufacturers made the usual announcements regarding signing the sales contracts for classic airliners, the most exciting news came from the companies engaged in changing aviation forever by using electrical power. It is obvious that EVTOL aircraft manufacturers are now far from the prototyping stage and are getting ready to enter commercial service and engage in operations that seemed close to science fiction only last year.

A good example is AutoFlight. All the analysts saw the German-based company as one of the leading contenders for an early entry into the passenger-carrying market. AutoFlight had marked the minds of aviation specialists by disclosing how close they were to their first civilian certification. Although this is the case, AutoFlight revealed that they had been working diligently on another application for their EVTOL. After seeing how difficult it was to fight wildfires around populated areas, AutoFlight transformed the cargo version of their EVTOL (the CarryAll) into a fire bomber. With its agility, the capacity to carry up to four 100 kg extinguishing canisters on a distance of over 200 km. This solution allows firefighting organizations to deploy very quickly and target fires in areas where traditional firefighting aircraft cannot reach easily. The Firefighting version of the CaryAll EVTOL will enter service in 2024.

E22 Spark will have 180m takeoff distance, 300+ km range, 1 hour duration with 30 minutes reserve, 80-120 kts cruise, 600kg max takeoff weight and 100+kw electric motor.

The United Arab Emirates is well known worldwide for its oil production facilities. This doesn't mean local companies only focus on mineral oil solutions! During the Dubai Airshow, EANAN, a UAE company, demonstrated its range of EVTOL targeted at the passenger-carrying, cargo, and emergency response markets.

Ali Al Ameemi, CEO of EANAN Aviation, remarked, "Our aim is to be the city's first commercially operating air mobility company. From congestion-free travel to faster delivery of goods, assisting emergency response, and monitoring remote facilities, AAM has the potential to transform economies and societies.". EANAN was showcasing its S 120 and S 700 Heavy Cargo models for the first time at stand 63 at this week's Dubai Airshow.

2023 年迪拜航展：

电动！

在全球最大航展之一的本届迪拜航展上，电动显然是亮点之一。尽管空客、波音和其他传统飞机制造商照例宣布签署客机的销售合同，但最令人兴奋的消息还是来自那些致力于通过电动改变航空业的公司。很明显，eVTOL 公司现在已经远远脱离了原型设计阶段，正进行适航审定并准备投入商业运营，而这些事直到去年还看似科幻小说。

峰飞公司就是一个很好的例子。所有分析家都认为这家在上海、德国和美国都有机构的公司会是最早进入载客市场的主要竞争者之一。峰飞公司透露了一些他们取证的进度，在航空专家的心目中留下了深刻印象。尽管如此，峰飞公司表示，他们一直在为 eVTOL 的另一项适航申请努力工作。在看到在人口密集和山区灭火有多么困难之后，峰飞公司将其 eVTOL的货运版（CarryAll，凯瑞鸥）改装用于消防用途。凭借其灵活性和垂直起降的优势，它可以携带四个 100 公斤重的灭火弹，无需跑道就可以起飞，飞行距离超过 200 公里，。这一解决方案使消防部门能够快速部署，适用于传统消防飞机无法轻易到达的火灾区域。消防型“凯瑞鸥“eVTOL预计将于 2024 年投入使用。

阿拉伯联合酋长国因其石油生产而闻名世界。但这并不意味着当地公司只专注于油气田的解决方案。在迪拜航展期间，阿联酋公司 EANAN 展示了针对客运、货运和紧急救援的 eVTOL 系列产品。EANAN Aviation 公司首席执行官阿里-阿米米（Ali Al Ameemi）表示："我们的目标是成为迪拜第一家商业运营的空中交通公司。从无拥堵旅行到更快地运送货物、协助紧急救援到远程监控，先进空中交通具有改变经济和社会的潜力。“在本届迪拜航展上，EANAN 公司 首次在 63 号展台展示了其 S 120 和 S 700 重型货运eVTOL机型。

空客直升机测试采用人性化方式驾驶 eVTOL

Airbot and Honneywell

AIBOT 公司由 Jerry Wang 和 RK Jia 于 2022 年在美国加州共同创立，该团队正在制造一架由八个电机驱动的 eVTOL 飞机，最多可容纳六名乘客和一名飞行员。该机最大起飞重量为 7000 磅，目标航程为 250 英里，最高巡航速度为每小时 250 英里，适用于全球城市之间和大都市内的短途飞行。在迪拜航展期间，AIBOT 宣布已与霍尼韦尔公司达成协议，将使用这家美国高端航空电子设备专业公司开发的线传飞控系统。霍尼韦尔公司设计的小型电子设备重量很小，只有一本书大小，极大地提高了 AIBOT 新设计的便利性和飞行安全性。

AIBOT was co-founded by Jerry Wang and RK Jia in 2022 in California, USA, and the team is building an aircraft that eight electric motors will power and accommodate up to six passengers and a pilot.

With a maximum take-off weight of 7,000 pounds, the aircraft has a target range of 250 miles and a top cruise speed of 250 mph, making it suitable for short-haul use cases between cities and metropolitan areas across the globe. During the Dubai Airshow, AIBOT announced that it had agreed with Honeywell to use the Fly-by-wire system developed by the American company specializing in high-end avionics. With negligible weight and the size of a book, the compact electronics designed by Honeywell dramatically increase the ease of piloting and the safety in flight of the AIBOT new design.

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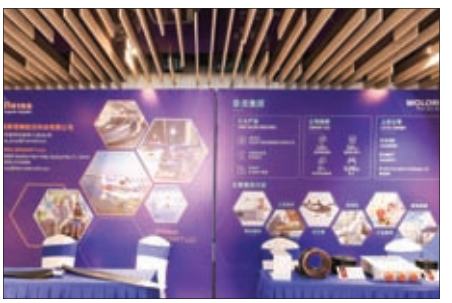

ORYX,

尽管 Bellwether 首次亮相是在 2021 年的迪拜航展上，但自那时以来它已取得了长足的进步。今年，该公司展出了最新的 EVTOL--ORYX，能够在 20 分钟内运送 3 名乘客飞越 80 公里。但最令人瞩目的是其搭载的技术。值得注意的是，由 Bellwether Advanced Mobility Solutions（"BAMS"）设计的认知飞行控制系统（CFCS）和自适应电力推进系统（AEPS）构成了 Oryx 飞行控制机制的基石。这些系统确保了飞行的稳定性和运行效率，最终提高了乘客的舒适度，并为机上娱乐项目提供了空间。

Although it made its first appearance at the Dubai AirShow in 2021, Bellwether has come a long way since then. This year, the company was exhibiting its newest EVTOL, the ORYX, capable of transporting three passengers over 80 kilometers in 20 minutes. But what is most remarkable is the technology embarked onboard. Notably, the Cognitive Flight Control System (CFCS) and the Adaptive Electric Propulsion System (AEPS), both engineered by Bellwether Advanced Mobility Solutions ("BAMS"), form the bedrock of the Oryx's flight control mechanisms. These systems ensure flight stability and operational efficiency, ultimately enhancing passenger comfort and providing room for in-flight entertainment options.

Archer

On October 18, EHang announced that it signed a strategic cooperation agreement with the Hefei Municipal Government in China to jointly build a low-altitude economy industrial ecology in Hefei city. EHang will participate in Hefei's comprehensive application demonstration project of unmanned systems, and start the regular operation of unmanned aerial vehicles in Luogang Central Park in Hefei. Luogang Central Park is committed to becoming the world's leading Urban Air Mobility (UAM) super-hub aerodrome. The Hefei Municipal Government plans to provide EHang with a total of $100 million worth of support, including coordinating or facilitating purchase orders for no less than 100 EH216-S eVTOL, as well as financial support.

Another company that attracted the attention of visitors and experts alike is Archer. It announced planning to start operation as an air taxi operator as soon as 2026 in the UAE. Archer and the Abu Dhabi Investment Office announced plans to make the UAE its first international launch partner, with plans to commence air taxi operations in both Abu Dhabi and Dubai in 2026. In addition, Archer is working with global manufacturing partner Stellantis and regional partners Falcon Aviation and GAL–AMMROC to build out aircraft manufacturing capabilities to service regional demands in the UAE and surrounding areas.

Voltaero's new charger 新型充电器

Jean Botti showed in Dubai the new compact charger system which has been developed by the French eAircraft startup. The universal mobile charger for the Cassio family of electric-hybrid airplanes and other electric aircraft was unveiled by VoltAero at the Dubai Airshow. This intelligent charging unit is part of VoltAero's strategy to create the infrastructure for its Cassio airplane family, which begins with the five-seat Cassio 330. The charger also will be offered for applications with other e-aircraft and eVTOLs.

让 – 博蒂（Jean Botti）在迪拜展示了这家法国电动飞机初创公司开发的新型紧凑型充电器系统。该公司在迪拜航展上发布了用于 Cassio 系列混合电推飞机和其他电动飞机的通用移动充电器。该智能充电装置是该公司为其 Cassio 系列电动飞机（从五座的 Cassio 330 开始）创建基础设施战略的一部分。该充电器还可用于其他电动飞机和 eVTOL。

BDLI goes electric with Nex

Also the German German association for air- and space- industry (BDLI) had as well a focus on electric hydrogen at the Dubai Airshow, and UAM technology players on its booth one of the eVTOL players was Nex AERO a startups which have the goal
to develop the first lift and cruise Hydrogen eVTOL for regional Air mobility. The aircraft should have a range of over 500 Kilometers and is designed around the fuel cell from he UK company intelligent Energy.

德国航空航天工业协会（BDLI）也在迪拜航展上重点展示了氢能航空，其 UAM 技术展台上的 eVTOL 参与者之一是 来自柏林的 NEX Aero 公司，这是一家初创公司，目标是为区域空中交通开发第一架氢能 eVTOL，设计航程超过 500 公里，氢燃料电池由英国公司 intelligent Energy 设计。

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The electric aircraft which was rel4ase now were either flighttest prototype or could be, due to the short range endurance (of 35 to55 minutes) only be used for Traffic pattern in the flight training.
The german company Elaktra Solar released their E-Trainer with an endurance from 2.5 hours + reserve. After receivibng the UL- Certification in Germany the company proved the travel capability with a 550 km trip through Germany. The trip was organized in a Challenge against a Lucid air electric sportscar.

The Goal of this project was to prove that the e-aircraft and e-cars are already suitable for long distances today. Three years earlier, an electric aircraft took three days and twelve stages to cover a distance from Switzerland to the North Sea. Now we can manage the same route with significantly fewer stopovers in one day with our new electric aircraft, Elektra Trainer. The flight should start from Memmingen and also end at Norderney. Due to the bad weather, it was decided the evening before to start in Gelnhausen near Frankfurt instead of in Memmingen.
In the first stage, our factory pilot, Uwe Nortmann, flew over 200 km to the gliding performance center of NRW in Örlinghausen near Bielefeld. During a press conference, the batteries of the aircraft were recharged. In the second stage, we went directly to the destination - Norderney Island Airport. After 220 km, our pilot landed at the destination airport with over 30% battery charge.
One day later, Uwe Nortmann took the return flight to Hanover, with a stopover in Oldenburg-Hatten. This stage was particularly challenging because a weather front had to be crossed in pouring rain and headwinds.
Hannover Airport celebrated the first landing of an electric aircraft on this occasion. The plane was honored with a water baptism by the airport fire brigade. The subsequent discussion about the future concepts of e-mobility in aviation found great interest from numerous reporters from newspapers, radio and television stations.
The new managing director of the airport did not want to miss the opportunity to try out the pioneer of future means of transport, Elektra Trainer, for himself. Two other employees of the airport, a professional pilot and a media representative were able to collect the first impressions of an e-flight. After these four demo flights, Elektra Trainer landed with over 50% of the battery capacity still available.
With this project, we hope to have set another milestone in the e-mobility of general aviation.
The project found a great public response in European media- The E- Challenge was to prove: Proof the long-distance suitability of an electric aircraft and an electric car which it did. In the End the car was faster as on the 550 km distance there was no charging needed while the aircraft needed to be charged 1 time.

德国之旅：

电动飞机出行成为现实

电动飞机早已经飞起来了，不过大部分的电动飞机要么是用于试飞的原型机，要么是由于续航太短（35 至 55 分钟）而只能更多用于本场的飞行训练。
德国电动飞机公司 Elaktra Solar 发布了他们的双座电动飞机 “E-Trainer”，续航时间为 2.5 小时 + 储备电量。在德国获得超轻机认证后，该公司在德国进行了 550 公里的长途飞行，证明了其长距离飞行的能力。 这次飞行是挑战 Lucid 电动跑车的一次活动。

本次飞行的目标是证明电动飞机和电动汽车已经适用于当今的长途旅行。三年前，一架电动飞机花了三天时间，经过十二个航段，从瑞士飞到了北海。现在，我们可以使用这架Elektra Trainer新型电动飞机飞相同的航线，而大大减少中途落地的次数。这次飞行原计划从德国的梅明根出发，在诺德奈结束。出发当天由于天气恶劣，前一天晚上决定从法兰克福附近的格尔恩豪森出发。

在第一阶段，Elektra Solar公司的飞行员 Uwe Nortmann 飞了 200 多公里，到达位于比勒费尔德附近 rlinghausen 的北威州滑翔中心。在新闻发布会期间，电池正好充电。第二阶段直接前往目的地——诺德尼岛机场。220公里后，飞机降落在目的地机场，电池电量还有超过30%。
停留一天后，乌韦 · 诺特曼（Uwe Nortmann）驾机返回汉诺威，在奥尔登堡–哈滕（Oldenburg–Hatten）中途停留。这个航段特别有挑战性，因为在倾盆大雨和逆风中必须穿过天气锋面。
汉诺威机场举行仪式庆祝电动飞机在该机场的首次降落。这架Elektra Trainer飞机受到了机场消防队的水门仪式的礼遇。随后举行的关于电动航空和电动汽车未来发展的研讨会引起了众多报纸、广播和电视台记者的极大兴趣。

汉诺威机场的新任总经理不想错过亲自体验未来交通工具 Elektra Trainer 电动飞机的机会。机场的另外两名员工、一名专业飞行员和一名媒体代表也有幸获得了乘坐电动飞机的第一印象。在这四次演示飞行之后，Elektra Trainer 仍有超过 50% 的电池容量。

Elektra Solar公司希望通过本次飞行在通用航空的电动领域树立一个里程碑。本次飞行也确实起到了很好的宣传效果，在欧洲媒体上引起了公众的热烈反响——本次挑战赛证明了电动飞机和电动汽车的长途适用性。最后的结果是，Lucid电动车完成这趟旅程的用时更短，因为在 550 公里的距离上完全不需要充电，而Elektra Trainer电动飞机需要落地充电 1 次。

Skyroads 天空之路

The German startup skyroads from Munich has the goal to bring Advanced Air Mobility in the air with new Air traffic system from ground up. Instead trying to let the eVTOL fly and integrate in the existing Air traffic control system which is still very much designed on Voice communication Skyroads believes that for this new type of mobility a totally new digital system has to be designed from ground up to be able in future to also integrate also autonomous flying drones and eVTOLs as well as the existing low level traffic. Skyroads CEO Corvin Huber will present their ideas also at the e-Flight-Forum in Kunshan (China) on the 28 and 29th November.

来自慕尼黑的德国初创公司 skyroads 的目标是通过全新的空中交通系统实现先进的空中交通管理。Skyroads 认为，为了实现这种新型的空中交通方式，必须从头开始设计一个全新的数字系统，以便在未来将自主飞行的无人机和 eVTOL 以及现有的低空交通整合在一起，而不是试图让 eVTOL 飞行并整合到现有的空中交通管制系统中。Skyroads 首席执行官科尔文－胡贝尔（Corvin Huber）将在 11 月 28 日至 29 日于中国昆山举行的第七届国际电动航空论坛上介绍他们的想法。

MgM Compro 动力更强劲

The Czech Motor specialist from Czech republic is constantly enlarging its range. After supplying several Light sport aircraft manufacturers with electric motors in the range of 100 Kw. In a research program supported by the Czech government the Company from the city of Zlin is now developing an electric Propulsion system to replace a PT 6 turbine in Commuter aircraft with Power a range between 450 and 600 Kw. MGM Compro CEO Martin Dvorsky will present at the e-Flight-Forum in Kunshan (China) on the 28 and 29th November.

这家来自捷克的电机企业不断扩大其产品范围。在为多家轻型运动飞机制造商提供 100 千瓦级别的电机，以及为全球多家 eVTOL 制造商提供升力电机和电控产品。在捷克政府支持的一项研究计划中，来自兹林市的该公司目前正在开发一个电推进系统，以取代功率范围在 450 至 600 千瓦之间的短途支线飞机上的 PT 6 发动机。MGM Compro 首席执行官 Martin Dvorsky 将在 11 月 28–29 日于昆山举行的第七届国际电动航空论坛上发言。

eMagic 新型无人机电驱系统

The German eVTOL startup has developed a whole set of ne motors for its single seated eVTOL which is currently flying in Germany in the ultralight category. The aircraft is a proof of concept for an unpiloted drone for cargo and Medivac. The new motors are completely designed and build by eMagic team. “Our Focus is to have motors which are extremely light and at the same time very powerful and reliable,” stated eMagic CEO Michael Kügelgen. He will present at the e-Flight-Forum in Kunshan (China) on the 28 and 29th November.

这家德国 eVTOL 初创公司为其单座 eVTOL 开发了一整套电驱系统，目前正在德国试飞。该机是用于货运和医疗运输的无人机的验证机。新电机完全由 eMagic 团队设计和制造。"eMagic 首席执行官 Michael Kügelgen 表示：" 我们的目标是生产出重量极轻，同时又非常强劲可靠的电机。他将在 11 月 28–29 日于昆山举行的第七届国际电动航空论坛上发言。

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Elfly Noemi:

Seaplane for China?

The Norwegian startup Elfly showed their 9 Seat electric Seaplane design for the first time last autumn. They have a lot of challenges to overcome, but they also have a very clear business case. To do electric commuter Flights along the Norwegian coast. While the Aircraft is under development they have analyzed other options around the world were their aircraft could work.

Norway has with its rough weather conditions specially in wintertime many challenges for electric flying but it also has a unique setup as: 1st The commuter aircraft are used along the Long coast - as part of the public transport system – as there are neither fast Railway nor motorways. And this commuter flights are partly paid by the Government. 2nd Norway has over 95% renewable electric energy. 3rd the government took the decision in the [illegible] In 2017 the Government took the decision to convert the commuter flights until 2030 to electric and start if possible in 2025. And 5th through the income from oil and Gas Norway has the money to pay for this. "As we are working very heavily on the development of the Noemi plane and ramping up our team, we have also done a large global research." Says Eric Lithun Founder and CEO of Elfly, "we analyzed the option for an fully electric short haul Seaplane around the world and found several interesting cases – One of it would be the Shanghai Region". One large advantage in operating an electric aircraft as a seaplane is that you have so many more alternates than operating a land plane in Norway all the fjords are potential landing fields this may also give us credits on the reserves. As most of the industrial centers are along the cost they mostly have a port in the center of the city. So you can fly city center to city center. Elfly CEO Eric Lithun will present at the e-Flight-Forum in Kunshan (China) on the 28 and 29th November.

Elfly Noemi：

适合中国的电动水上飞机?

去年秋天，挪威电动飞机初创公司 Elfly 首次展示了他们的 9 座电动水上飞机设计。他们当然还需要克服许多挑战，但他们也有一个非常清晰的商业案例。他们的目标是在挪威沿海地区提供电动飞机通勤服务。在飞机研发的同时，他们还分析了世界上其他可以使用他们飞机的地方。

挪威的气候条件恶劣，尤其是在冬季，这给电动飞行带来了许多挑战，但挪威也有其独特的环境： 第 1 条由于既没有快速铁路，也没有高速公路，通勤飞机作为公共交通系统的一部分在长海岸线上使用。这种通勤航班的部分费用由政府支付。第二，挪威拥有 95% 以上的可再生能源。 第四，政府在 2017 年决定将 2030 年之前的通勤航班改为电动航班，并尽可能在 2025 年开始。第五，通过石油和天然气收入，挪威有足够的资金来支付这笔费用。 "由于我们正在大力开发 Noemi 飞机并组建团队，我们还在全球范围内进行了大规模的调研"。Elfly 公司创始人兼首席执行官 Eric Lithun 说："我们分析了全球范围内全电动短途水上飞机的选择，发现了几个有趣的案例--上海地区就是其中之一。在挪威，所有的峡湾都是潜在的着陆场，这也为我们提供了储备。 由于大多数工业中心都在成本沿线，它们大多在城市中心设有港口。因此，您可以从市中心飞往市中心。 Elfly 首席执行官 Eric Lithun 将出席 11 月 28 日至 29 日在中国昆山举行的电子飞行论坛。

Text: Willi Tacke, Fotos: Willi Tacke, Bavairia

AAM Forum

2. BavAIRia AAM in Oberpfaffenhofen

Lively discussions in Munich: The 2nd AAM Forum took place in the new hangar of the Technical University and Munich University of Applied Sciences.

Following its debut last year, the Bavarian aviation cluster BavAIRia invited guests to the second Advanced Air Mobility (AAM) Forum 2023 at the Air Tech Campus Oberpfaffenhofen/Munich at the end of September

Announced as „AAM Ecosystem Boosters“, leading companies from the Bavarian AAM sector and start-ups were at the start. In addition to the established eVTOL developers and manufacturers Airbus, AutoFlight, Lilium and Volocopter, many suppliers and engine manufacturers such as Rolls Royce Electrical and Hensoldt also accepted the invitation and, together with Bavarian start-ups such as Vaeridion, e-Commuter and Odonata, provided interesting presentations and discussions. In the hangar of the Technical University (TU) and the Munich University of Applied Sciences in Oberpfaffenhofen, many of the companies presented details, models and also complete aircraft, such as the Elektra Trainer from Landsberg, which was presented by test pilot Uwe Nortmann. The event was opened by Bavarian State Minister Florian Herrmann. In order to show more openness to international players, which is also desired here, it would perhaps make sense to hold the very interesting presentations in English at the next edition of the BavAIRia AAM Forum. □

Florian Hermann with the Odonata-Modell.

Qinyin Zhang von Rolls Royce Electrical.

Testpilot Uwe Nortmann stellte das UL Elektra Trainer vor.

AutoFlight from Augsburg was of course also there.

第二届巴伐利亚先进空中交通论坛举行

继去年首次举办之后，巴伐利亚航空产业协会（BavAIRia）于 9 月底在慕尼黑附近的奥伯法芬霍芬航空技术学院举办了第二届先进空中交通（AAM）论坛。

作为 "AAM 生态系统的推动者"，来自巴伐利亚 AAM 行业的领先企业和初创公司参加了该论坛。除了空中客车公司（Airbus）、峰飞公司（AutoFlight）、Lilium 公司和 Volocopter 公司等知名的 eVTOL 开发商外，罗罗电气（Rolls Royce Electrical）和亨索尔特公司（Hensoldt）等许多供应商和发动机制造商也接受了邀请，并与 Vaeridion 公司、e-Commuter 公司和 Odonata 公司等巴伐利亚AAM初创企业一起进行了精彩的演讲和讨论。在位于上帕芬霍芬的慕尼黑工业大学（TU）和慕尼黑应用科学大学的机库中，许多企业展示了飞行器模型和全尺寸原型机，如兰茨贝格公司的 Elektra Trainer电动飞机，试飞员乌韦-诺特曼（Uwe Nortmann）展示了这架双座电动教练机。 巴伐利亚州州长弗洛里安-赫尔曼（Florian Herrmann）宣布活动开幕。为了向国际参与者显示出更大的开放性（这也是我们希望看到的），下一届 BavAIRia AAM 论坛或许将请发言人用英语进行这些颇有意义的发言。

Update of Autoflight's 2 -ton cargo e-VTOL airworthiness certification

Autoflight's 2-ton cargo electric vertical take-off and landing (e-VTOL) uncrewed aircraft V2000CG "Carryall" was accepted by the Chinese regulator CAAC for a type certificate on September 29, 2022, taking the lead in the industry.

As a large-scale cargo-carrying eVTOL, the V2000CG has a maximum take-off weight of 2,000 kilograms and a maximum payload of 500 kilograms. It is purely electric-driven and unmanned. Its carrying capacity is equivalent to that of a small helicopter. V2000CG adopts a composite wing configuration which can not only take off and land vertically like a multi-rotor aircraft and helicopter, but also cruise quickly and efficiently like a fixed-wing aircraft, integrating convenience, low cost and large load capacity. It will be used in logistics, emergency response, disasterrelief, firefighting and many other scenarios with a range of 100 kilometers.

In December 2022 the CAAC established the V2000CGCertification Review Team and held the first certification meeting on December 13 to officially start

峰飞航空科技 2 吨级物流 eVTOL 适航审定最新进展

峰飞航空科技的2吨级物流电动垂直起降（eVTOL）无人驾驶航空器V2000CG“凯瑞鸥”于2022年9月29日由局方受理了型号合格证的申请，在业内率先启动了同级别物流eVTOL的适航审定进程。

作为大型载物eVTOL，V2000CG“凯瑞鸥”最大起飞重量2000公斤，最大载荷达500公斤，采用纯电驱动，无人驾驶，运载能力等同小型直升机。“凯瑞鸥”采用复合翼构型，既能如同多旋翼航空器和直升机那样垂直起降，又能像固定翼飞机一样快速高效巡航，集便捷性、时效性、低成本、大载重于一体，将应用于100公里范围内的物流、紧急物资运输、消防应急救援等场景中。

2022年12月，民航总局成立了“峰飞V2000CG无人机型号合格审查组”，于12月13日召开型号合格审定首次会议，正式开启V2000CG的TC审定工作。会上，峰飞航空科技全面汇报了公司设计保证系统、V2000CG型号设计及运行说明、审定基础及取证计划，并展示了型号审定计划和条款符合性检查单。审查工作组代表对型号新颖的设计特征、审定基础条款的合理性以及符合性验证考虑等提出了相关意见和建议，为型号设计熟悉和审定基础的全面确定打下基础。

2023年5月，民航局V2000CG合格审查组批准了峰飞V2000CG型号无人驾驶航空器系统审定计划（CP）和审定基础条款符合性检查单（“一份计划”+“一个检查单”），标志着该型号适航审定从“符合性计划制定”阶段正式进入“符合性确认”阶段。
按照CAAC中国民航局适航程序，CP和条款符合性检查单获得局方批准代表着审查组和申请人对V2000CG型号符合性规划、条款符合性方法、里程碑适航工作等基本达成一致意见。在“符合性确认”阶段，审查组将对申请人的符合性工作开展检查和确认。接下来，型号升力/推力系统、结构强度、电池系统、航

the type certification work of the V2000CG .At the meeting, Autoflight reported on the company's design assurance system, V2000CG design and operation procedure, certification basis and plan, and displayed the certification plan and compliance checklist. Representatives of the review working group put forward relevant opinions and suggestions on the novel design features of the model, the rationality of the certification basis, and compliance verification considerations, laying the foundation for familiarity with the model design and comprehensive determination of the certification basis.

In May 2023, the V2000CG Certification Review Team approved the V2000CG certification plan (CP) and certification basis compliance checklist ("one plan" + "one checklist"). This marks that the airworthiness certification of this model has officially entered the "conformity confirmation" stage from the "compliance plan formulation" stage. In accordance with the CAAC Airworthiness Procedures, the approval of the CP and Clause Compliance Checklist by the CAAC means that the certification review team and the applicant have basically reached an agreement on the V2000CG compliance plan, and compliance methods, milestone airworthiness work, etc. In the "Conformity Confirmation" stage, the review team will inspect and confirm the applicant's compliance work. Next, the compliance verification work in various majors such as the lift/thrust system, structural strength, battery system, avionics, flight performance, etc. will be comprehensively advanced in accordance with the plans in "One Plan" and "One Checklist".

At the end of May 2023 the Airworthiness Department of the CAAC issued a notice to solicit opinions on the special conditions for the V2000CG type certification. The V2000CG became the first 2,000 kg class aircraft to have its application for type certification officially accepted by the CAAC. Therefore, this special condition will also become the special condition for airworthiness certification of the first 2-ton cargo eVTOL.

In July 2023 V2000CG completed the power system plateau test. A total of 10 altitude points were selected from 0 meters altitude to 4800 meters altitude, and more than 30 sets of data were sampled. The plateau test of the power system is a system-level R&D test project. It can more accurately obtain the motor pulling force and power characteristics of the lift/thrust motor under different altitude (high altitude) conditions, and carry out the output characteristics of the power system completed in the laboratory in the early stage. This round of plateau tests calibrated the motor-propeller aerodynamic model under different humidity, temperature, and air pressure conditions to verify the reliability of the power system in various environments. The V2000CG power system has experienced the test of natural environments such as deserts, Gobis, grasslands, rainforests, and snow-capped mountains. After this test, Autoflight can use the measured power characteristics of different plateau conditions to update the flight performance analysis of the entire aircraft and prepare for subsequent plateau test flights of the entire aircraft. Next, V2000CG will carry out compliance verification work in various major systems such as lift/thrust system, structural strength, battery system, avionics, and flight performance.

空电子、飞行性能等各个专业的符合性验证工作将按照“一份计划”和“一个检查单”中的规划全面推进。

2023年5月底，民航局适航司发布通知，就峰飞V2000CG型无人驾驶航空器系统型号合格审定项目专用条件征求意见，V2000CG成为首款获中国民航局正式受理型号审定申请的2,000公斤级载物eVTOL飞行器。因此，该专用条件也将成为首款2吨级载物eVTOL的适航审定专用条件，是继吨级固定翼大型无人运输机TP500的适航审定专用条件征求意见稿之后民航局适航司发布的又一无人驾驶航空器系统型号合格审定项目专用条件。

2023年7月，V2000CG完成动力系统高原测试。从0米海拔到4800米海拔，共选取了10个海拔点，采样30余组数据。动力系统的高原试验是系统层级的研发测试项目，可以更准确地获得升力/推力电机在不同海拔（高海拔）条件下电机拉力和功率特性，对前期在试验室完成的动力系统的输出特性进行校准。本轮高原试验，标定了不同湿度、温度、气压情况下的电机-螺旋桨气动模型，验证动力系统在多种环境下的可靠性。V2000CG动力系统经历了沙漠、戈壁、草原、雨林、雪山等自然环境考验。本次测试后峰飞可以利用不同高原条件的实测动力特性，更新整机飞行性能分析，为后续开展航空器整机高原试飞做好准备。接下来，V2000CG将开展升力/推力系统、结构强度、电池系统、航空电子、飞行性能等各个专业的符合性验证工作。

China's Pace: Electric Aviation is drawing big attention and investment in China

As one of the pioneering countries in electric aviation and, to a larger extend, in electric mobility as a whole, with such leading companies like Autoflight, EHang, RX1E, Aerofugia and so on, China has been keeping its own pace of development in this domain and sometimes is little known to other countries.

As electric aviation startups in Europe and the US are having a difficult time in the stock market and fundraise, China is picking up her pace in this field. Electric aviation led by eVTOL is gaining big momentum in China right now in terms of investment and government support. Some loud signals include: many local governments in China are launching industry and investment policies to develop electric aviation and to attract projects to go to. Electric aircraft projects especially eVTOL are mushrooming in China. Venture capital are becoming interested in this field and are making investment in startups.

Interestingly the Chinese local government, academia and enterprises create a new concept called "low altitude economy" which is mainly used to describe the industry, use cases and market of the flying activities centered around the evolving urban air mobility including both passenger-carrying and cargo delivery, theelectric aviation technology and products, and unmanned aerial vehicles (UAV) for civil use on top of traditional general aviation. This "low altitude economy" may also be created to differentiate from the traditional general aviation which is not very active in China, and to emphasize on the economic value of the electric aviation industry. In general, the "low altitude economy" concept can be considered as an extended general aviation industry with electric aviation and UAV.

Here is a summary of the latest industry policies concerning electric aviation by the local governments in China prepared by Flying Pages:

Shenzhen:

Some background information:

Shenzhen is the hub of electronic products, technology innovation and venture capital in China. The city is the home of DJI, the dominating company in consumer drones, and BYD, the largest electric vehicle manufacturer in the world, and Huawei, Tecent the largest shareholder of Lilium, and many technology innovation

X2 two-seat eVTOL of Xpeng AEROHT in Guangzhou at the display of a low-altitude economy event in Shenzhen
小鹏汇天研制的 X2 双座 eVTOL 在深圳宝安区的低空经济活动上展示

电动航空创新引领，低空经济蓄势待发

低空经济是以各种有人驾驶和无人驾驶航空器的低空飞行活动为牵引，辐射带动相关领域融合发展的综合性经济形态。低空一般是指垂直范围真高（距地表高度）1000 米以下空域。低空经济由低空制造、低空飞行、低空保障和综合服务等主体产业构成，在促进经济发展、加强社会保障、服务国防事业等方面发挥着日益重要的作用。

近年来，随着我国以无人机和电动航空技术为代表的航空新技术的发展和应用，以这两项技术和产品作为典型代表的低空经济也获得了各方面的广泛关注，行业蓄势待发。特别是2023年以来，各部门、各层级、各地区相继出台了大量有针对性的低空经济鼓励政策。据不完全统计，今年截至目前，全国已有126项低空经济相关政策，其中国务院及各部委发布27项，地方政府发布99项。

今年6月28日，《无人驾驶航空器飞行管理暂行条例》公布，将于2024年1月1日起实施。该条例从多个方面落实和体现了促进低空经济发展的要求，明确规定，国家鼓励无人驾驶航空器科研创新及其成果的推广应用，促进无人驾驶航空器与大数据、人工智能等新技术融合创新；国家在确保安全的前提下积极创新空域供给和使用机制，完善无人驾驶航空器飞行配套基础设施和服务体系。

10月10日，工信部、科技部、财政部、民航局联合印发《绿色航空制造业发展纲要（2023-2035年）》（以下简称《纲要》），明确发展目标，到2025年，使用可持续航空燃料的国产民用飞机实现示范应用，电动通航飞机投入商业应用，电动垂直起降航空器（eVTOL）实现试点运行，氢能源飞机关键技术完成可行性验证，绿色航空基础设施不断夯实，形成一批标准规范和技术公共服务平台，有效支撑绿色

“Prosperity”eVTOL of Autoflight will fly a demo route between Shenzhen and Zhuhailater this year.
峰飞航空科技研发的 5 座 eVTOL 载人航空器“盛世龙”今年将在深圳和珠海间进行演示飞行

startups, and is not far from EHang, the first eVTOL company listed in NASDAQ. As the center of venture capital in China the industry policy of the Shenzhen government raises significant awareness among many other Chinese local governments. Shenzhen is undoubtedly the hub of small drones of the world with near 10 billion euro production value per year, over 80% percent of the global market, and a complete and agile supply chain of electric mobility.
In June 2022 Shenzhen city government published the strategic development plan for "low altitude economy" from 2022 to 2025.
In June 2023 Bao'an district of Shenzhen city, the well-known technology hub in China, signed a deal with Lilium, the German eVTOL startup listed in NASDAQ, who will set up the Asian head office in Baoan district.

In July 2023 Bao'an district of Shenzhen published the industry policy of the "low altitude economy". According to the plan, enterprises that have their headquarters or R&D and manufacturing located in Bao'an District and carry out eVTOL airworthiness certification in China will be subsidized up to 50% of the total cost required in the whole process of type certification with each enterprise not exceeding 30 million RMB (about 4 million euro).
The plan supports enterprises to set up routes for freight and passenger-carrying operations. For example, medium and large UAVs with a takeoff weight over 25 kg will be subsidized with 90 yuan per flight, and each enterprise will not exceed 1000 million yuan per year. Sightseeing flight will be subsidized with 100 yuan per seat per flight, intercity commuting flight for 200 yuan per seat per flight, intracity commuting flight for 300 yuan per seat per flight with an annual subsidy cap of 10 million yuan per year.

In September 2023 Longgang district of Shenzhen city published the industry policy of the "low altitude economy". The district plans to provide up to 30 million RMB (about 4 million euro) subsidy to relevant enterprises, projects and operation.

In In September 2023 Longhua district of Shenzhen city published the industry policy of the "low altitude economy". The district plans to provide 200 million RMB (25 million euro)subsidy in three years to relevant enterprises, projects and operation. An individual enterprise or project can receive up to 30 million RMB (4 million euro) subsidy.

Beijing:

In September 2023 Beijing city published the industry policy to develop so-called "future industries" including intelligent mobility which include "new energy-powered flying cars" and the "convergency of intelligent and network-connected ground vehicles, general aviation and UAV". The policy has not yet specified subsidy policy though.

Guangzhou:

In September 2023 Huangpu district and the development zone district of Guanghzou city published the industry policy of the "low altitude economy". An individual enterprise or project can receive up to 30 million RMB (4 million euro) subsidy. For eVTOL enterprises that settle their headquarters or R&D, production and manufacturing in Huangpu District, they will be given a maximum one-time subsidy of 15 million RMB (2 million euro) after obtaining the type certificate and production certificate.

Tibet

In September 2023 Tibet Autonomous Region published the industry policy to develop general aviation in Tibet. The policy sets disaster relief and emergency service as the focus of general aviation use in Tibet and will provide up to 50 million RMB (6.4 million euro) subsidy to enterprises, general aviation airports and operators.

Xinjiang

In September 2023 Xinjiang Autonomous Region published the industry policy to develop general aviation. An individual enterprise or project can receive up to 30 million RMB (4 million euro) subsidy. The unmanned-converted Y5 (Chinese version of Antonov 2) cargo delivery UAV startup announced to set up the manufacturing facility in Xinjing with a total investment of 800 million RMB (100 million euro) and annual production of 150 Y5 UAV.

The delivery drone of Meituan has been upgraded for several times. The latest model can carry 2.5 kg and reach 5 km at 83 km/h.
美团无人机经过多次迭代后，最新型号最大载重 2.5 公斤，飞行半径 5 公里，飞行速度 83 公里每小时

航空生产体系、运营体系建设。《纲要》明确“绿色+”助推民机产业升级、开辟电动航空新领域、布局氢能航空等新赛道三大发展路径，提出建设四大体系、实施三个重点工程。

10月10日，深圳市人大常委会办公厅就《深圳经济特区低空经济产业促进条例（草案修改一稿征求意见稿）》（以下简称《条例》）公开征求意见。深圳市人大常委会已将《深圳经济特区低空经济产业促进条例》作为今年的重点立法项目，这是全国首部低空经济产业发展法规。《条例》共有九章六十一条，从明确基本原则、健全管理机制、统筹基础设施建设、优化飞行管理服务、拓宽产业应用领域、加强产业支持和技术创新、强化运营安全保障等方面重点作出规定，为促进深圳低空经济产业高质量发展提供法治保障。今年的深圳市《政府工作报告》首次提出，建设低空经济中心。8月初，深圳市交通运输局发布《深圳市关于支持低空经济高质量发展的若干措施（征求意见稿）》，拟推出12项具体措施，为深圳低空经济加速起飞注入更强大的推力。

7月13日，峰飞航空科技与深圳市宝安区政府签订合作备忘录，深圳宝安区政府将协助峰飞eVTOL大型航空器项目在深圳市及粤港澳大湾区城市落地，也将为峰飞大型eVTOL航空器在本地试飞、产品销售、低空基础设施建设、低空经济运营等方面提供全方位支持。峰飞航空科技将在今年第四季度将进行全球首例eVTOL跨城空中交通航线深圳-珠海示范飞行。由该公司自主研发的5座eVTOL载人航空器“盛世龙”将从深圳“湾区之光”起飞，至珠海日月贝降落后再执行返程飞行，单程航时预计15分钟、总航时约30分钟，飞行往返距离超过80公里。同日，亿航智能也宣布将在深圳欢乐港湾商圈，打造首个城市空中交通运营示范中心，推出EH216-S自动驾驶飞行器的空中旅游观光体验服务。亿航智能方面介绍，宝安区政府将为该飞行器在本地的产品采购、融资租赁、基础设施建设、低空运营等提供全方位支持。基于此，亿航智能未来将在宝安区落地EH216-S组装交付中心、研发测试中心以及维修保障中心。

Delivery drones of Meituan has been commercially operating a dozen delivery routes in several cities in China with a focus on Shenzhen city since 2021 and has made over 140,000 drone deliveries as of today.
美团物流无人机自从 2021 年开展试运行以来，已经在以深圳为主的全国多个城市共开展 11 条飞行路线的商业运营，截至目前已经飞行超过 14 万架次

The type certification update of RX4E four-seat electric airplane

The RX4E is the world's first four-seater all-electric aircraft undergoingtype certification under Part 23 rule. It has a maximum takeoff weight of 1,200 kg, 1.5 hour duration and a range of 300 kilometers. The RX4E four-seater electric aircraft was developed by the Liaoning General Aviation Academy (LGAA) in 2017, and made its first flight on October 28, 2019 and was accepted by CAAC for its type certification application in November 2019.

锐翔 RX4E 四座电动飞机适航审定稳步进行

RX4E 是全球首款申请 23 部飞机适航审定的四座纯电动飞机，最大起飞重量 1200 千克，续航时间 1.5 小时，续航里程 300 千米。RX4E 四座电动飞机 2017 年由辽宁通用航空研究院立项研制，2019 年 10 月 28 日首飞，2019 年 11 月 11 日东北民航局正式受理了该机型的取证申请，目前正在进行型号合格证（TC）审核工作。

The RX4E is based on the revised CCAR-23 for airworthiness certification. Based on the validation practice and related technical research, CCAR-22 was revised and promulgated on May 6, 2022 and implemented on August 1, 2022. The new "Airworthiness Regulations for Normal Class Aircraft" (Part 23) specially add a chapter of airworthiness requirements for electric aircraft - "Chapter H Supplementary Requirements for Electric Aircraft Power Plant", which makes special provisions on "electric propulsion system", "battery and power distribution system" and "battery and electric power system fire protection", and puts forward airworthiness requirements. The supplementary revision of the CCAR-23 electric aircraft airworthiness requirements provides strong policy support for China's electric aircraft airworthiness certification and electric aviation development, and also provides a sample for the global civil aviation industry to establish a compatible electric aircraft airworthiness standard system.

On February 17, 2023, the thermal runaway test of RX4E's lithium battery was successfully completed. This is the first time that the general aviation lithium battery has carried out thermal runaway test in China, and the successful completion of the test not only marks that the compliance verification of the RX4E power lithium battery system has been completed, but also a new breakthrough in the verification of the power lithium battery in the field of general aviation.

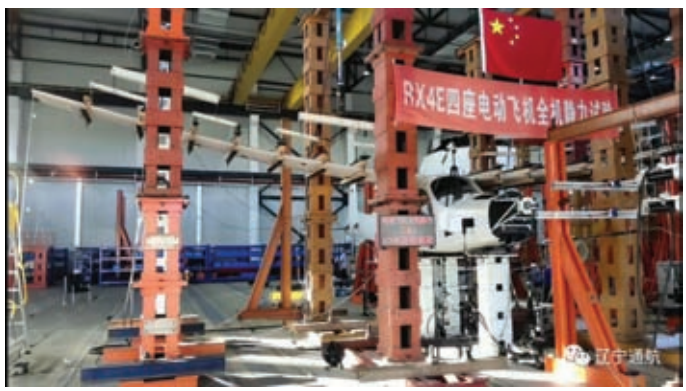
On August 14, 2023, the ultimate load test of the maximum bending moment and shear force of the RX4E wing was successfully completed. The ultimate load test of the maximum shear force of the wing bending moment is the most serious working condition in the static test of the whole aircraft, and it is one of the most critical test items to verify whether the structural strength of the aircraft meets the requirements of the design and airworthiness regulations. In order to ensure the successful passage of this test, it took one year to carry out iterative optimization design and verification of the configuration, and successively tested more than 4,000 test pieces, more than 610 component details, 3 batches of root assemblies and 2 batches of full-size wings of different configurations.

On September 26 to 27, 2023, the RX4E emergency landing dynamic test was successfully passed at the China Aircraft Strength Research Institute. The emergency landing dynamic test is an important test to assess the survivability of the aircraft, and it is also one of the most difficult projects in the process of airworthiness certification.

On October 25, 2023, the RX4E successfully carried out a stall characteristic flight test in Shenyang. As one of the compliance verification flight tests, the stall characteristic has a high risk and a high degree of difficulty in flight testing, which is also a watershed in the flight performance verification of aircraft. The dynamic relationship of the stall characteristics of the new aircraft determines the posterior limit position of the aircraft's center of gravity, which is also the necessary process for the early exploration and progression of the tailspin test of the highest risk subject.

RX4E是基于修订后的CCAR-23部进行适航审定。基于审定实践和相关技术研究，2022年5月6日新修订颁布、自8月1日起施行的中国民用航空规章《正常类飞机适航规定》（CCAR-23部）专门为电动飞机增加了一个章节的适航要求——“H章电动飞机动力装置补充要求”，对“电推进系统”“电池和配电系统”以及“电池和电动力系统防火”作出了特别规定，提出了适航要求。此次CCAR-23部电动飞机适航要求的补充修订，为我国电动飞机适航取证和产业发展提供了有力的政策支持，也为全球民航业建立兼容的电动飞机适航标准体系提供了成功样本。

2023年2月17日，RX4E动力锂电池热失控试验顺利完成。这是通用航空动力锂电池首次在国内开展热失控试验，此次试验的顺利完成不仅标志着RX4E动力锂电池系统符合性验证工作已经全部完成，同时也是通用航空领域对动力锂电池验证工作的新突破。



2023年8月14日，RX4E机翼弯矩剪力最大工况的极限载荷试验在哈飞设计试验室顺利通过。此次机翼弯矩剪力最大工况的极限载荷试验是全机静力试验中最严重工况，是验证飞机结构强度是否满足设计及适航规章要求最关键的试验项目之一。为了确保本次试验顺利通过，历时一年时间，对构型进行了迭代优化设计及验证，先后测试了4000余件试片、610余件元件细节件、3批根部组合件及2批不同构型全尺寸机翼。2023年9月26日~9月27日，RX4E四座电动飞机应急着陆动态试验在中国飞机强度研究所顺利通过。 应急着陆动态试验是考核飞机适坠性的一项重要试验，也是适航取证过程中验证项目难点最大的项目之一。

2023年10月25日，由辽宁通用航空研究院研制的RX4E四座电动飞机，在沈阳某机场顺利开展失速特性试飞试验。失速特性作为符合性验证试飞科目之一，风险系数高、试飞难度大，同样也是飞机飞行性能验证分水岭。新型号飞机的失速特性动态关系决定了飞机重心的后极限位置，也是最高风险科目尾旋试验前期摸索递进必经过程。

EH216-S has flown over 9300 times over 20 sites in China during the trial operation
EH216-S 已经在国内 20 多个地点进行了 9300 多次试运行飞行

CAAC Issued Type Certificate to EH216-S eVTOL

On 13 October 2023, EHang held a ceremony in Beijing to celebrate the issuance of the type certificate (TC) for its two-seat EH216-S eVTOL from the Civil Aviation Administration of China (CAAC). This was a momentous day for EHang and for eVTOL industry. It took two years and 10 months for CAAC to issue this TC, from the date of acceptance of EHang's application (Dec. 28, 2020) to the issuance date on the TC (Oct. 12, 2023).

This type certificate sets several milestones including:

- It was the first TC issued to an eVTOL in the world.
- This is the first type certificate issued to a passenger-carrying, pilotless aircraft in the world.
- The TC was issued under CCAR-21 category and was certified as an uncrewed aircraft systems (UAS)
- It is a Normal Category TC, not as a Restricted Category, nor a Special TC, nor as a Permit to Fly.

There are a number of steps that EHang must complete before legal commercial operations, including obtaining the production certificate and the operator certificate. In addition, there are still some regulatory gaps that CAAC needs to fill — especially in the flight standards domain — before eVTOL aircraft can bea real market in China, such as the qualification and licensing for the ground operators, vertiport design, construction specifications, etc.

亿航载人无人驾驶 eVTOL 取得中国民航局适航证

10 月 13 日，EH216-S 无人驾驶载人航空器系统型号合格证颁证仪式在北京民航国际会议中心隆重举行，中国民航局向亿航智能正式颁发 EH216-S 无人驾驶载人航空器系统型号合格证。2020 年 12 月 28 日亿航申请该机适航审定，2021 年 1 月中国民航局正式受理 EH216-S 的适航审定申请，《亿航 EH216-S 型无人驾驶航空器系统专用条件》于 2022 年 2 月正式发布，10 月 12 日签发适航证。10 月底，民航总局发布了该适航证的数据单

EH216-S eVTOL at the issuance ceremony.
颁证仪式上展示的 EH216-S eVTOL

EH216-S的这张适航证创造了多项第一和eVTOL行业里程碑，包括：

- 这是世界上第一张颁发给载人eVTOL飞行器的适航证。
- 这是世界上第一份颁发给载人无人驾驶飞行器的适航证。
- 该适航证是根据 CCAR-21部发布。
- 该适航证是正常类，不是限制类或特殊类，也不是飞行许可证，因此更具意义。

民航局总工程师殷时军在发证仪式上的致辞中指出，自2021年受理EH216-S型号合格证项目以来，民航局高度重视，统筹资源，全面开展项目审查工作，坚持创新理念，积极探索无人驾驶航空器系统审定路径方法，坚持审慎包容，安全平稳开展载人无人驾驶航空器系统审定，经过各方努力，EH216-S顺利获颁TC证。当前，我国无人驾驶航空产业整体仍处于培育阶段，民航局统筹谋划，持续推动无人驾驶航空产业高质量发展。企业要处理好发展和安全的关系，在后续运行过程中严格运行标准，在保障安全的前提下，不断优化产品设计，逐步扩大应用场景。制造企业要善于总结经验，形成可推广可复制的技术和标准并同步开展国际化工作，提升中国技术和产品的国际竞争力和影响力，持续保持无人驾驶航空发展领先优势，为推进我国新型工业化建设，实现中国式现代化贡献力量。

接下来，亿航还将进行EH216-S生产许可证和单机适航证的取证工作。亿航表示，已完成了文件审查和大部分文实审查，正在进行生产交付飞行审查。第一批取证后的EH216-S无人驾驶载人航空器计划于2023年第四季度完成生产下线，并交付客户使用。过去2年，在中国民航局“先行先试、审运结合”的指导方针下，亿航智能已在国内18个城市的20个地点使用EH216-S开展低空旅游场景的试运行，累计完成9,300多架次运行试飞。

The director general of the airworthiness department of CAAC, Ms.Zhenmei Yang, handled the type certified to the founder and CEO of EHang, Mr.Huazhi Hu
适航司司长杨桢梅将适航证交给亿航创始人兼 CEO 胡华智

The performance and specification of EH216-S
EH216-S 的部分性能参数

The type certificate of EH216-S is issued under CCAR-21
In Chinese: EH216-S 按 CCAR-21 部进行适航审定

The EH216-S was approved with a maximum takeoff weight of 1,367 lb (620 kg), an 18.6-mile (30-km) range, a service ceiling of 394 ft (120 m) above ground level (AGL) and 3,280 ft (1,000 m) above mean sea level (MSL), and a maximum cruising speed of 48.6 kt (90 km/h). The aircraft has a maximum flight duration of 25 minutes with a 25% battery reserve (though the flight conditions were not specified for the reserves). It also requires two ground operators, though it wasn't stated how many aircraft the two operators can control or monitor at the same time. These performance data — especially the servicing ceiling — certainly make commercial operations tricky and use-case limited.

The issuance of this TC is symbolic and strongly indicates CAAC's desire to lead the global eVTOLrace. CAAC officials have stated publicly that the agency wants to take a gradual but steady approach towards full commercialization and operation of eVTOL — with parallel rulemaking in both certification and operation at the same time — which means that CAAC is perhaps willing to take the risk of letting EHang begin operations earlier, rather than later.

The effect of this TC could be double edged. On one hand, it will likely raise the awareness and interest of investors and the eVTOL market in China. According to an unofficial count, there have been about 50 eVTOL designs at different stages in China, including about 10 projects at substantial stages with either a flying prototype or a considerable amount of capital for development.On the other hand, the doubt on the validity of this TC in the community may cause a backfire on the intention of CAAC to promote eVTOL and the application of airworthiness of other eVTOL models in China, because CAAC now needs to convince the market and other applicants that it plays by the rule book to create a level field for all players.It is hoped that CAAC will (like every authority should) issue strict operation rules that will try to avoid accidents in general, and especially accidents where people might be injured or even killed.

A TC has a lot of chances to bring the development forward, but it also requires a lot of responsibility on the part of the manufacturer, the operator and the regulator.

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ROLLS ROYCE

An Australian Startup striving for electric future

Infinitus Aero, a startup of electric aircraft design from Edwardstown in South Australia, is working on a two-seat full electric airplane design called E22 Spark based on the popular CT ultralight/LSA of Flight Design GmbH in Germany. They are committed to become the first commercially available electric light sport airplane (LSA) in Australia. The company is formed by a team of aviation veterans from business development and flight school operation.

They are currently integrating global battery technology into the E22 Spark prototype and preparing for their test flight program within 90 days. With a commitment to 'zero emissions, zero boundaries', Infinitus Aero is preparing to have a 'planet positive' impact on the globe. The company also has a four-seat electric airplane on their radar down the road.

The founding team include Michael Monck, the CEO, Barrie Rogers, the chief commercial officer, and Gus Wrethman, the COO. Michael has been involved in the aviation industry for over 30 years and was a founding member of the Aviation Industry Consultative Council and through his position on the General Aviation Advisory Network, he provides industry advice to the Federal Transport Minister. Michael is also the current Chair of the Board for Recreational Aviation Australia and sits on the National Emerging Aviation Technology Consultative Committee. Prior to co-founding Infinitus Aero Barrie purchased a flight training school and acquired the first imported electric aircraft into Australia. He has managed various regional airports around Australia and established a Robinson Helicopter franchise in the USA. He was previously a Director, Board Member and Chair of the SA Chapter of the Australian Airports Association. Gus spent time leading an operations department for one of the largest flight training organizations in Australia and prior to this he gained significant, leadership, contract and project management experience across the globe for the largest provider of helicopter services to the offshore oil and gas industry.

E22 Spark will have 180m takeoff distance, 300+ km range, 1 hour duration with 30 minutes reserve, 80-120 kts cruise, 600kg max takeoff weight and 100+kw electric motor.

一家致力于电动未来的澳大利亚初创公司

Infinitus Aero 是一家来自南澳大利亚爱德华兹敦的电动飞机初创公司，正在基于德国 Flight Design GmbH 公司畅销的 CT 超轻型 / 轻型运动飞机设计一款名为 E22 Spark 的双座全电动飞机。他们致力于成为澳大利亚第一架商用电动轻型运动飞机（LSA）。该公司由一群航空资深人士组成。

他们目前正在将电池技术集成到 E22 Spark 原型机中，并为 90 天内的试飞计划做好准备。秉承“零排放、零边界”的承诺，Infinitus正准备为全球带来积极影响。该公司还计划下一步研制一架四座电动飞机。

公司创始团队包括首席执行官 Michael Monck、首席商务官 Barrie Rogers 和首席运营官 Gus Wrethman。 Michael 涉足航空业 30 多年，是澳洲航空业咨询委员会的创始成员，并通过他在通用航空咨询网络的职位，向联邦运输部长提供行业建议。迈克尔还是澳大利亚休闲航空理事会现任主席，并且是澳洲国家新兴航空技术咨询委员会的成员。在共同创立Infinitus Aero之前，Barrie购买了一家航校，并在澳大利亚进口了第一架电动飞机。他管理过澳大利亚各地的多个支线机场，并在美国建立了罗宾逊直升机特许经营权。他曾担任澳大利亚机场协会南澳分会的董事、董事会成员和主席。 Gus 曾领导澳大利亚最大的飞行培训组织之一的运营部门，在此之前，他在全球最大的海上石油和天然气行业直升机服务提供商中获得了重要的领导和项目管理经验。

E 22 Spark设计为180米起飞距离、300+ 公里航程、1 小时续航时间（30 分钟储备）、80–120 节巡航、600公斤最大起飞重量和 100+千瓦电机。

The first AERO Asia Expo to begin

From November 23rd to 26th this year, the first AERO Asia will be held at the Zhuhai International Airshow Center. AERO Asia is a project jointly founded by AERO Expo in Friedrichshafen in Germany and China International Aviation and Aerospace Exhibition (Airshow China), and is committed to becoming the leading general aviation trade show in China and Asia. More than 140 general aviation industry enterprises from nearly 20 countries and regions will participate in the exhibition, covering many fields such as emergency rescue, emerging aviation products, UAV products and application services. The enthusiastic participation of well-known enterprises in China and abroad fully demonstrates their strong confidence in the future development of the general aviation in China. This year's AERO Asia will be broadcast live on the exhibition site in conjunction with China Central Radio and Television Station to report the grand occasion of the exhibition in an all-round way.

Zhuhai, as the host of the China Airshow and one of the first 26 national general aviation industry comprehensive demonstration zones identified by the National Development and Reform Commission, has formed a complete general aviation industry chain such as aircraft manufacturing and maintenance services after years of development, and has continuously improved general aviation services relying on Lianzhou Airport and Jiuzhou Airport. With the holding of AERO Asia, Zhuhai will also form a "double air show" pattern of hosting the "Airshow China" and "AERO Asia" every other year. As a professional exhibition of general aviation, AERO Asia will play an important role in broadening the development ideas, accumulating project resources, innovating the development model, enriching the industrial ecology and forming industrial agglomeration in Zhuhai's general aviation industry.

As one of the organizers of AERO Asia, Friedrichshafen Messe GmbH is the organizer of AERO Expo in Germany which is the world's leading general aviation trade sho with more than 40 years of experience. With 25 years of excellence, Airshow Zhuhai has developed into China's largest and most internationally influential comprehensive professional air show. With a high level of service and organizational capabilities, AERO Asia will bring together global merchants in the field of general aviation, display the latest products, promote cutting-edge scientific and technological exchanges and business cooperation, and create value for customers.

Sustainable Aviation Forum at AERO Asia

The aviation industry is one of the first industries to establish a global carbon reduction target which proposes to achieve net-zero carbon emissions by 2050. International organizations, many countries and regions are actively promoting the realization of aviation emission reduction targets through policies, investment, and technology. In order to promote the aviation technology innovation, the development of the supply chain and international exchanges and cooperation, Zhuhai Airshow Group Co., Ltd. and Flying Pages GmbH from Germany will jointly host the Sustainable Aviation Forum during the 2023 AERO Asia exhibition.

Date:23 November 2023; Venue:Meeting Room 3, Forum area in Hall 7, Zhuhai International Airshow Center.The subjects will cover hydrogen aviation, early commercialization of electric aviation, supply chain and ecosystem.

时间	活动名称	地点
11 月 22 日 18:30-20:30	2023 亚洲通用航空展欢迎晚宴	珠海度假村酒店（千禧宫）
11 月 23 日 09:30-11:00	开幕式	珠海国际航展中心 4 号馆
11 月 23 日 10:30-16:00	商务与通用航空安全论坛	珠海国际航展中心 7 号综合论坛区 4 号会议室
11 月 23 日 14:00-17:00	2023 通航动力产业发展大会	珠海国际航展中心 7 号综合论坛区 2 号会议室
	AOPA 国际会员大会 亚洲经济论坛	珠海国际航展中心 9 号馆（H9A23）AOPA 交流展示专区
	通用航空装备制造发展论坛	珠海国际航展中心 7 号综合论坛区 1 号会议室
	可持续航空论坛	珠海国际航展中心 7 号综合论坛区 3 号会议室
	智能无人系统与反制技术论坛	珠海国际航展中心 7 号综合论坛区 5 号会议室
11 月 24 日 09:00-12:00	无人机起降场地建设发展论坛	珠海国际航展中心 7 号综合论坛区 1 号会议室
	应急安全无人系统创新应用论坛	珠海国际航展中心 7 号综合论坛区 5 号会议室
	未来城市空中交通论坛	珠海国际航展中心 7 号综合论坛区 3 号会议室
11 月 24 日 09:00-17:00	亚洲通用航空暨 通航发展（珠海）论坛	珠海国际航展中心 9 号馆（H9A23）AOPA 交流展示专区
11 月 24 日 14:00-17:00	2023 亚洲通用航空展企业峰会	珠海国际航展中心 7 号综合论坛区 4 号会议室
11 月 25 日 09:00-17:00	亚洲通用航空人才交流大会	珠海国际航展中心 9 号馆（H9A23）AOPA 交流展示专区

There will be conferences covering many subjects during AERO Asia including the Sustainable Aviation Forum organized by Flying Pages in the afternoon on 23 November.

亚洲通用航空展 AERO ASIA

今年11月23日至26日，首届亚洲通用航空展将在珠海国际航展中心举办。亚洲通航展是由德国腓特烈斯哈芬通用航空展(德国通航展)和中国国际航空航天博览会（中国航展）联合打造的全新项目，致力成为中国乃至亚洲地区领先的通用航空贸易展。届时，近20个国家和地区的超140家航空及无人机产业链企业将参展，展示内容覆盖通航应急救援、新兴航空消费、通航运输及作业、无人机产业链配套及应用服务等多个领域。国内外知名企业的踊跃参展，充分展示出对通航领域未来发展的强大信心，以及对中国市场的热烈期待。本届亚洲通航展将联合中央广播电视总台对展会现场进行直播，全方位报道展会盛况。

珠海作为中国航展举办地、国家发改委确定的首批26个国家通航产业综合示范区之一，历经多年发展，在通用航空领域逐步形成了飞机制造、维修服务等较为完整的通用航空产业链，并依托莲洲机场、九洲机场不断提升通航服务水平。随着亚洲通航展的举办，珠海也将形成双年看“中国航展”、单年看“亚洲通航展”的“双航展”格局。作为通用航空的专业会展，亚洲通航展将对珠海通用航空产业拓宽发展思路、积累项目资源、创新发展模式、丰富产业生态、形成产业集聚等方面起到重要作用。

亚洲通航展的主办方之一腓特烈斯哈芬展览有限公司是德国通航展的主办方。德国通航展是全球领先的通用航空贸易展览平台，拥有40余年成功经验。珠海中国航展拥有25年卓越历程，现已发展成为中国规模最大、最具国际影响力的综合性专业航展。亚洲通航展将以高水平的服务与组织能力，汇集全球通航领域的商家，展示最新产品，推动前沿科技交流与商贸合作，为客户创造价值。

可持续航空论坛

Sustainable Aviation Forum

航空业作为首个建立全球行业碳减排目标的行业之一，提出了2050年实现净零碳排放。国际组织、多个国家与地区正积极从政策、投资、技术等入手，促进航空减排目标的实现。为深化航空技术创新，促进产业链发展和国际交流合作，珠海航展集团有限公司与德国飞页有限责任公司将于2023亚洲通用航空展期间联合主办可持续航空论坛。

论坛主题包括：氢能航空、电动航空早期商业化发展、供应链与产业生态。论坛将于亚洲通航展开幕的11月23日下午在珠海国际航展中心7号馆会议论坛区的3号会议室举行。

AERO Asia will cover a wide range of general aviation products

Changing perspectives, exploring new paths – for innovative technologies and materials that are setting the standards of tomorrow. We work on this every day in close cooperation with our costomers and experts around the world. In this way, we are using bionics to create entirely new cabin experiences, applying ultra-light cons_truction to make aircraft even lighter and are leading the way in the field of Urban Air Mobility. With our dis_ruptive solutions, we wish to rethink mobility and improve our lives. Here, our focus is always on the individual.
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