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2013地理设计国际会议特别报道
Special Focus on 2013 Geodesign International Conference

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摘要

2013年10月28~29日，地理设计国际会议在北京大学召开。此次会议围绕“地理设计：人地关系优化设计的理论与实践”的主题，采用主旨报告、专题讨论及论文征集等方式对地理设计的定义、框架、未来发展前景以及实践等方面进行了深入的交流与讨论。本文汇集了此次会议与会嘉宾的精彩言论。

关键词

地理设计；优化设计；理论；实践；北京大学

Abstract

28th~29th October, 2013, the Geodesign International Conference was held in Peking University. The conference included keynote speeches, lighting talks and conference proceedings, discussing the geodesign's concept, framework, promise and practice around the theme "Geodesign: Maximinzing Beneficial Impacts". This article collects the important speeches of this conference.

Key words

Geodesign; Maximizing Beneficial Impacts; Theory; Practice; Peking University

科学技术的快速发展为人类带来了更加便捷的生活，但是由于人类活动缺少相互间的协调和制约，我们的大地景观变得支离破碎，也严重地影响了许多地球生命赖以生存的自然环境。今天，规划师、学者、决策者等所面临的挑战是由人为活动导致的全球环境的剧变。依靠传统的规划设计方法，凭经验、靠直觉来收集资料数据、分析现状、策划未来，其结果往往不尽如人意。因此，亟需一种积极、理性、科学、有效的方法去影响未来。地理设计概念的提出，试图从学术上打破地理学、城市规划学、景观设计学、建筑学与土木工程学等学科之间的界限，并从技术上对人居环境规划中所面临的问题提出解决方法。

地理设计是一个新兴的、能够集多学科和计算机技术（CAD、BIM、GIS等）于一体的新领域。它是对人工及自然环境进行综合规划的一套技术。它在规划概念、分析、具体设计、利益方的参与合作、创新设计、模拟和评价中起着技术支撑作用。它借助数字化的计算机技术和交流技术来支撑信息化设计，并及时地反馈所提方案的含义，包括大范围的、错综复杂的，或长时间维度的影响分析与评估。地理设计这一新的形式为在可持续的、综合性的设计过程中，实现最大化正面影响（并最小化负面影响）提供了可能性；更重要的是地理设计为错综复杂的、大尺度的，甚至在世界范围内的分析提供了可能，而这些正是促进可持续城市化与确保地球生存的有效途径。

为了进一步促进地理设计的发展和应用，推动不同学科及地区之间的交流，北京大学建筑与景观设计学院和Esri中国信息技术有限公司于2013年10月28~29日在北京联合举办了“地理设计国际会议（2013，北京）”。会议围绕“地理设计：人地关系优化设计的理论与实践”的主题，采用主旨报告、专题讨论及论文征集等方式进行了深入的交流与讨论。

1~4. 地理设计国际会议现场
1~4. The scene of the Geodesign International Conference

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Geodesign is a new term for an age-old practice-planning, designing, implementing and evaluating changes to our built and natural environment transformed by modern software tools and scientific models that make interactive impact analysis possible, so that designers can continually evaluate the impacts of their proposals. The Internet and modern communications technologies including embedded and remote sensors, multimedia feedback, web-based interactions, group decision making, mobile devices, social networks, crowd sourced data collection, and others that can now be coupled with scientific advances in understanding and analysis of Earth's natural systems as well as our urban environments. The range of geodesign challenges is enormous, from real-world problems of housing, transportation, air and water pollution, and energy distribution, to issues of effective computer interfaces, collaborative design approaches, and decision support graphics and presentations.

Geodesign projects leverage the powers of digital computing (CAD, BIM, GIS, etc.) and communications technologies to foster information-based design and provide timely feedback about implications of proposed designs, including impacts and evaluations covering a larger area, greater complexity, or longer time-frame than the immediate design proposal (for example, the impacts over time on watershed-scale hydrological processes of a single proposed dam, or the aggregate carbon footprint of several individual building component / system decisions). This new geodesign paradigm offers the possibility of maximizing beneficial impacts (and minimizing deleterious ones) in responsible, sustainable, synthetic design projects of enormous complexity and large-, even global-scope essential for new approaches to sustainable urbanism and planetary survival.

This Geodesign International Conference (2013, Beijing) hosted by the College of Architecture and Landscape Architecture of Peking University and Esri built upon recent international advances, and brought together a combination of professionals — designers, scientists, public policy experts and decision makers — to present and discuss current projects and emerging models of geodesign practice, and speculated on directions and improvements for the future.

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地理设计：人地关系优化设计的理论与实践
Geodesign: Maximizing Beneficial Impacts

时间： 2013年10月28~29日
地点： 北京大学
主办： 北京大学建筑与景观设计学院，Esri中国
承办： 景观中国网站，《景观设计学》杂志
赞助单位： Esri中国，土人设计
同期活动： 城市景观之路——北京大学景观设计学系列专题研修班（第二十二期）
2013年《景观设计学》杂志、景观中国网理事单位会议
2013第九届全国高校景观设计毕业作品交流论坛及颁奖仪式
第九届全国高校景观设计毕业作品展暨2013知名景观企业优秀作品全国巡回展（北京大学站）

Dates: October 28 ~ 29, 2013
Venue: Peking University
Hosts: College of Architecture and Landscape Architecture of Peking University, Esri China
Partners: Landscape Architecture China Website (LAC), *Landscape Architecture Frontiers* Journal (LAF)
Sponsors: Esri China, Turenscpe
Events: The Way of Urban Landscape — Peking University Landscape Architecture Workshop Series (No. 22)
Council Members Meeting of *Landscape Architecture Frontiers* Journal and Landscape Architecture China Website
The 9th Chinese Landscape Architecture Graduate Works Students Forum and Award Ceremony
The 9th Chinese Landscape Architecture Graduate Works Exhibition and Famous Design Firm Works Exhibition

开幕词
Opening Speech

章新胜
Xinsheng ZHANG
世界自然保护联盟理事会主席，生态文明贵阳国际论坛秘书长
President of International Union for Conservation of Nature; Secretary General of Eco Forum Global Annual Conference Guiyang

当全世界人口达到100亿的时候，是否还有充足的饮用水和食物？我们的城市化建设该如何开展？这些问题仅仅依靠各国政府间的合作是不够的。我们需要在座的各位学界、业界人士携手并进，共同应对这个挑战。

Will there still be enough potable water and food when the world population reaches 10 billion? How should we plan for new urban construction? These issues cannot be solved by only intergovernmental cooperation. It is time for us, as scientists and professionals in the field of geodesign, to collaborate.

优化国土开发格局研究
Optimizing China's Land Development Pattern

董祚继
Zuoji DONG
中国国土资源部规划司司长
Director of Planning Division, Ministry of Land and Resources, China

目前中国的国土空间开发格局可以说是市场运行与地理设计叠加作用的结果，其最大的一个特点——也可以说是一个弱点——就是地方政府干预过多。市场这只“看不见的手”既有强大的积极威力，但也需要适当地加以约束，不能任其随意发挥。

China's contemporary pattern of land development can be seen as an overlay of both market factors and geographic design. One of its unique characteristics, which could also be seen as a critique, is that the local governments have intervened excessively. Although the “invisible hand” of the market acts constructively and energetically, appropriate restrictions and regulations on its operation are extremely necessary.

共享设计
Sharing Design

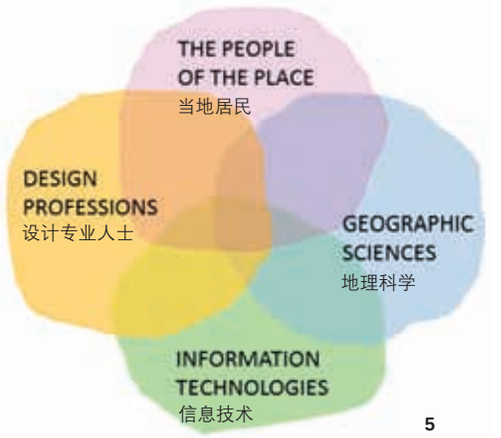
克里斯托弗·卡佩里
Christopher CAPPELLI
Esri公司全球业务总监
Corporate Director of Esri

GIS改变了我们的思考和行为方式，将地理科学融入了我们所做之事，打破了藩篱，实现了资源共享，促进了合作模式的开展。

GIS has changed how we think and act by integrating geographic science into what we do, breaking down barriers, sharing resources, and supporting collaborative approaches.

地理设计实践与教育的发展趋势及其影响
Trends and Influences and their Implications for Practice and Education in Geodesign

卡尔·斯坦尼兹
Carl STEINITZ
美国哈佛大学设计学院景观规划与设计名誉教授
Emeritus Professor of Landscape Architecture and Planning, Graduate School of Design, Harvard University



5. 这4个群体间的沟通与合作是地理设计成功的关键。
5. The communication and collaboration of the four groups is essential to the success of geodesign.

我今天的发言可以用4种不同颜色的部分来表示（图5）：设计专业人士（建筑设计师、规划师、土木工程师、景观设计师等从事创新设计的人群）、地理科学（包括生态学、水文学、地理学等方面，这些与我们如何理解这个世界息息相关，因为理解是创新的基石）、信息技术（这包括人们如何通过媒介进行交流，而这种媒介不仅限于计算机），以及最重要的一点，当地居民。这四者的交叉领域就是我们面临的问题，而这是不可能由单一的团队或学科所解决的。这4个群体的相互合作至关重要，但我们的实践和教育体系却对此考虑甚少。换言之，大家都知道合作的重要性，但教育和实践并没有使人们朝着合作的方向进行。我们来自不同的世界、说着不同的语言，我们都面临一些关乎到生存的问题，地理设计的框架或许可以成为帮助我们渡过难关的途径。

我认为目前的主要趋势为：环境和社会危机不断加剧、信息技术无处不在、人们对民主和公众参与的需求不断增加。这三个趋势将会对设计行业和地理科学方面的教育和实践造成日益深远的影响，这些领域中能对环境和社会变化产生影响的活动方式也正逐步形成。我们已经知晓这些变化，但并没有严肃认真地看待这些变化。

一，环境和社会危机不断加剧。我们面临着诸如人口爆炸、CO_2排放过量、全球气温上升、食物价格上涨、粮食和淡水资源短缺、生物多样性减少等重重危机，但我们在消除这些危机造成的负面影响方面尚缺乏通力协作的举措。

二，信息技术无处不在。个人电脑在获取信息资讯方面的飞速发展有目共睹，我们能够通过计算机做的事情也越来越多，可以这么说，我们与计算机之间的关系就像我们与其他人类之间的人际关系一样。很多基于云技术的数据都来自于普罗大众的手机，例如很多即时的、有效的有关日本福岛核事故辐射等级的数据披露均来源于公众的移动电话。

三，人们对民主和公众参与的需求不断增加。社交媒体具有巨大的政治影响力，无处不在的电算化技术和公众参与结合而成的强大力量并非偶然，信息的传播凝聚起了人们对环境设计和规划的参与需求。《欧洲景观公约》中承认景观是人类环境中的一个重要的组成部分，并明确规定每一个签署国要在景观政策的制定和实施过程中建立广泛的民众参与的程序机制。这一点不可小视，它强调了广大民众必须在景观政策的制定中具有发言权。而广大民众又该如何去做？地理设计或许（再一次）可以成为解决问题的出路所在。

显而易见，应对严峻的社会及环境问题绝不是凭设计的一己之力可以实现的。相反，这必然需要来自众多设计行业和地理科学等各方面人士的竭力合作。为了能够迅速地沟通和反馈，这种合作需将来自若干地点的技术相互连接，并依靠与当地居民——他们是直接参与者——的透明交流来实现。当地居民不再是委托方，而也是设计师中的一员（图6）。

我对地理设计的定义是：地理设计是一种方法，它与寻求改变的解决方案，和以地理环境和系统思维（而不是形象思维）为依托，（通常）以数字技术作为支持的影响模拟密不可分。这一定义的基础来自于迈克尔·古特柴尔德和史提芬·欧文的观点——我的观点简而言之就是，地理设计即通过设计、通过目的性的方式来改变地理环境。为此，我们需要在地理设计中运用一个以系统为导向的框架（无论是我或是其他人提出的框架），并在运用任何地理设计时回答以下6个问题（图7）：1）环境该如何被描述？2）环境如何运转？3）环境运转得好吗？4）环境可能被

怎样改变？5）改变可能会引发哪些影响？6）环境该如何改变？

地理设计是一个新创的词汇，它很好地体现出了“协同合作”这一行为，反映的并不是任何设计行业、地理科学或信息技术的单一领域。每一个参与者必须了解如何并能够在某些方面有所贡献，而这些方面是其他人无法贡献的。在整个过程中，任何人都不需要妥协、丧失他/她的专业、科学身份或个性。（我不希望看到任何人自称为“地理设计师”，或是称某一事物为“一件地理设计作品”。）

教育在推进地理设计进程中发挥着决定性的作用。教育需要一场革命。现在，科学家和设计人士认为学生必须了解这个领域中的方方面面。这与教育人们如何进行团队合作的方式截然不同。现在，大学对于教育的深度和广度问题并没有形成非常好的协调方式，我们还不具备跨学科沟通的先决条件。我们需要共享的学科知识、共享的语境、共享的语言。我们需要在将设计转变为方案的教育和实践方式上进行拓展。我们需要以一种合作的方式来组织教师团队，将每位教师所研究“问题”的类型、规模和尺度作为组建团队的依据。我们需要加强4种课程：首先是历史。我们要从历史的角度来分析哪些案例是成功的，哪些是失败的。其次，我们需要以模型方式，而不是内容来组织教学，因为模型方式中的思考方式要比那些可能会随着地理环境而不断变化的内容本身更加重要。（为什么中国学生要去哈佛大学学习？他们学习的不是内容本身，而是思考方式。）再次，我们需要认识到技术发展日新月异，而其应当建立在教学课程的基础之上。最后，我们需要加强项目导向型的实践学习。学生应进行实际操作，因为他们才是需要获得组织和操作经验的人。此外，我认为有必要设立地理设计的硕士学位——不是地理设计学硕士学位，而是与地理设计相关的地理学、生态学、建筑学、规划学硕士学位。

我认为重中之重是对“大学到底是什么”的理念进行改革。大学当然应该重视研究、教学和应用的深度。但它们也需要拓展研究领域的广度，并进行彼此合作。地理设计的合作必须在本科生、研究生和博士生层面均得到贯彻落实。一所以设计为导向的学校应该包括建筑设计、景观设计和城市规划专业。首先要在学院内建立合作，这意味着建筑系学生和规划系学生应进行实实在在的通力协作（图8）。目前大多数学院尝试合作的成果都并不理想，原因在于他们没有形成一套与地理设计相配套的教学构架。接下来是与其他群体间的合作，如科学家、科技人员以及普罗大众等。现在很多科学家的视野还仅局限于设计专业本身。下一个阶段是学校层级的合作，并需要建立起制度化的合作形式（图9）。这一过程需要花费数年的时间，但这对地理设计的成功与教育的未来绝对至关重要。

My talk is color coded into four groups (Fig. 5): design professionals (including architects, planners, civil engineers, landscape architects and other professionals who deal with innovation), geographic sciences (including ecology, hydrology, geography and other disciplines which are about how we understand the world — and we cannot be innovative without understanding), information technologies (involving the ability of people to communicate with each other regardless of the media and not just computers), and the most important, the people of the place. The central point is that we are really facing serious problems which cannot be solved by any group of people, and communication and collaboration of these four groups is essential, but our systems of education and practice do not plan for that. In other words, it is obvious that the collaboration is important, but it is not obvious that education and practice are producing people to do this. We come from different worlds and speak different languages, and we have some fundamental problems which a framework for geodesign may help us overcome.

We are facing three trends nowadays: increased environmental and social risk, ubiquitous information technology, and growing demands for democracy and public participation. They will increasingly influence the education and practice of the design professions and geographically oriented sciences, and the ways in which their activities towards influencing environmental and social change are organized and carried out. We all know about it, but we do not take them seriously enough.

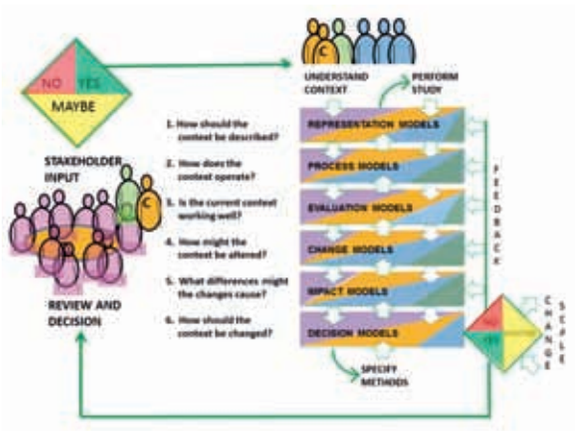
The first is increasing environmental and social risk. While population growth, global temperature rise, the crisis in food production and food price increase, air quality, fresh water and biodiversity decline are among us, we do not act in a sufficiently coordinated way toward mitigating their serious negative impacts.

The second is ubiquitous information technology. There is a rocketing increase in personal computer access to the information of the world. The things we can do with computing are greatly increasing. We interact with computing in ways that are almost like interpersonal relationships. There are lots of examples in which cloud-based data comes from people with cell phones. The immediate, available data, for example, about the radiation levels of the Fukushima nuclear disaster, was revealed from the cell phones of ordinary people.

The third is the growing demand for democracy and public participation. The political impact of social media is enormous, and the mixture between ubiquitous computing and public participation is not an accident. The spread of information causes people the demand for participation in environmental design and planning. The *European Landscape Convention* recognizes landscape in law as an essential component of people's surroundings, and prescribes that each ratifying country establish procedures for the participation of the general public in the definition and implementation of landscape policies. It is extremely important to highlight that the general public must define the landscape policies. And the question arises: How to do this? Here again, geosdesign may help.

It is clear that for serious societal and environmental issues, designing for change cannot be a solitary activity. Rather, it is inevitably a collaborative endeavor, with participants from various design professions and geographic sciences, linked by technology from several locations for rapid communication and feedback, and reliant on transparent communication with the people of the place who are also direct participants. The people of the place are not just the clients; they are the designers as well (Fig. 6).

Geodesign is a method which tightly couples the creation of proposals for change with impact simulations informed by geographic



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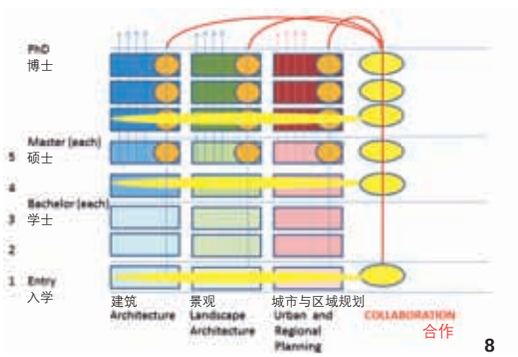
contexts and systems thinking (rather than shape thinking), and (normally) supported by digital technology. My definition of "geodesign" is based on that of Michael Frank Goodchild and Stephen Ervin. More simply, I would say that geodesign changes geography by design, by intentional change. To do this, we need to apply a systems-oriented framework for geodesign (mine or another), and to answer six relevant questions that apply to any geodesign circumstance (Fig. 7): 1) How should the context be described? 2) How does the context operate? 3) Is the current context working well? 4) How might the context be altered? 5) What differences might the changes cause? And 6) How should the context be changed?

Geodesign is an invented word, and a very useful term to describe a collaborative activity that is not the exclusive territory of any design profession, geographic science or information technology. Each participant must know and be able to contribute something that the others cannot or do not… yet during the process, no one need lose his or her professional, scientific or personal identity. (I do not want anybody to call himself / herself "a geodesigner", nor anything be called "a geodesign".)



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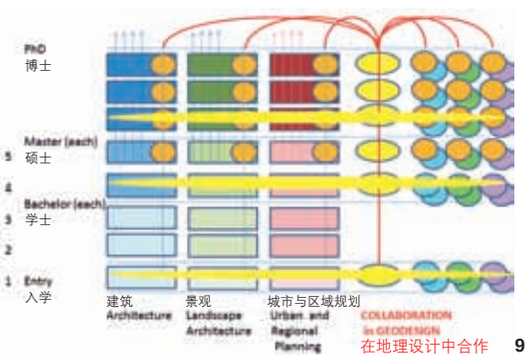

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6. 地理设计方式
7. 在做任何地理设计之前都需要回答的6个问题。
8. 地理设计在设计导向型学院中的教学合作模式
9. 地理设计在大学层级上的合作模式
6. Modes of geodesign
7. Six questions need to be answered for any geodesign circumstance.
8. Teaching for collaboration in geodesign in design-oriented school.
9. A university with collaboration in geodesign

The importance of education is fundamental to progress in geodesign. A revolution in education is required. Right now, scientists and design professionals believe that students have to know everything in their fields. But that is very different from educating people to lead collaborative teams. The conflict between depth and breadth is not resolved in the universities, and we do not have the prerequisites of cross-disciplinary communication. We need to have broad shared knowledge, shared assumptions, and shared language. We need to teach and practice many ways of making a geodesign proposal. We need to organize faculties in a collaborative way and based on which types, sizes and scales of "problem" they are studying. We need four kinds of courses. The most important is history, the history of case studies which worked and which did not worked. Secondly, we need courses organized by model type not by content type, because the ways of thinking in model types are more important than content which might change geographically. (Why should Chinese students go to Harvard? Not to learn the plans of north-eastern US but to learn how to think about the plans of north-eastern US.) Thirdly, we need to recognize that technology changes rapidly, and it should be on a tutorial basis. Finally, we need practical studies with project-oriented learning. And the projects should be run by students because they are the ones who need experiences in organization and running things. Furthermore, I think it is necessary to set up master degrees of geodesign — not master degrees in geodesign, but master degrees in geography, ecology, architecture, planning and other related fields in geodesign.

The most radical thing we need is a revolution of what university is. Universities certainly need depth of research, teaching and application. However, they also need breadth and collaboration. Collaboration in geodesign should be carried out at bachelor degree, master degree, and PhD degree levels (Fig. 8). A typical design-oriented school might have departments of architecture, landscape architecture, and urban planning. The first base of collaboration is in the school. This means the architecture, landscape architecture and urban planning students should really work together. Most schools have tried this but rarely with success, because they do not have a structure for geodesign-oriented teaching. The next phase is to get other groups, such as scientists, IT people and ordinary people into this collaboration. The next phase is at the university level, where there is need to institutionalize creative collaboration (Fig. 9). This will take years, but it is absolutely central for success in geodesign and the future of education.

地理设计展望
The Promise of Geodesign

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我在这里想谈一谈地理设计能为我们——尤其是学术界——带来的益处，以及这一概念的广阔背景。关于地理设计的概念的阐述有多种版本，我想复述一下卡尔·斯坦尼兹对其非常精练扼要的定义：地理设计即为用设计来改变地理环境。我曾对地理设计做出过如下评述：GIS是用来表述现状的，而地理设计则是用来表述未来的可能性的。杰克·丹杰蒙德则认为：地理设计是对于自然的设计。这些阐释都在告诉我们，地理设计——尤其是在GIS的配合下——是设计与地理学结合的产物。地理设计是对这个世界的一种基于科学理念的干预方式。它也许可以被认为是景观设计的一部分，但依照学术界的传统观点来看，景观设计并未被视为科学中重要的一部分，或者如卡尔·斯坦尼兹的定义中所指的地理学的一部分。

这里，我将列举我所在的加州大学圣巴巴拉分校开展的"海洋建模"项目。这是一个在海洋环境中应用地理设计的案例，关注于在圣巴巴内陆与岛屿之间的航道中的船舶流动问题。这些航道是来自深圳、釜山以及其他亚洲港口的大型船舶最低廉的航行路线，但其对鲸鱼——尤其是蓝鲸，这一地球上最大的生物——带来了侵扰。地理设计在这一项目中发挥着建立运往洛杉矶的货物运输和环境保护之间的平衡的作用。与其他地理设计项目一样，我们通过草图模型、地图绘制来寻求可选方案，这包括对航行路线进行极为细致的分析（图10–1）。"海洋建模"项目同样应用了GIS，通过互联网将利益相关方、科学家、决策者、来自全世界的居民及个人集合在一起（图10–2）。所以，从GIS的视角来看地理设计，我认为其包含两个紧密联系的方面，一方面是绘图与记录，另一方面则是分析、评估、预测、修正、改善。前者由人类审美所主导，后者则由自然科学所主导。我认为地理设计的核心是将创意与科学相结合。

那么地理设计的未来在哪里，人文与科学之间能否搭建起桥

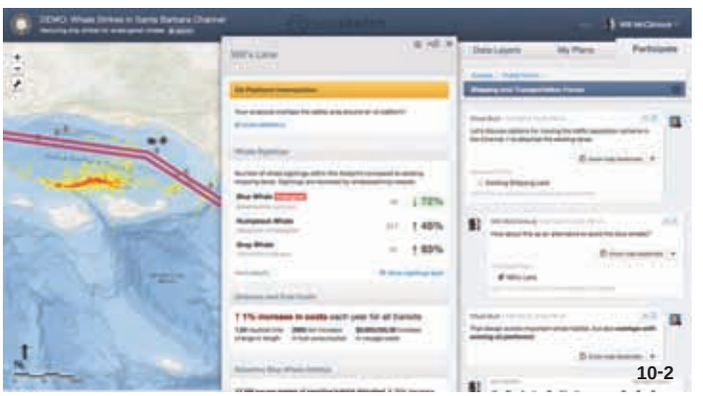
梁？地理设计是指在决策的过程中融入科学知识。换言之，就是让科学知识与真实的世界联系起来。而实现这一愿景的障碍是什么？首先以现有的学术组织方式来看，将所有的学科联合起来非常困难。在美国，很多大学的组织架构是将人文学科和自然学科划分为不同的科系，甚至分属不同的学院。由此产生的最大困难在于聘任与晋升。对于人文学科而言，创新性的学术活动通常是通过著书、展览、表演来衡量；而对于自然科学而言，则通过在期刊或会议中发表的论文来进行评判。这是两套没有任何交集的评判标准。而地理设计要求我们在这两个完全不同的世界之间建立起桥梁。

早在1959年，英国小说家查尔斯·珀西·斯诺在《两种文化》一文中谈到文理学科之间的鸿沟，以及缺乏共同语言的问题。这一老生常谈的议题为何被重新提起？地理设计是大有前景还是会随着时间而逐渐衰落？我认为这两种学科最终大有可能联系在一起，而地理设计的成功要从先前的失败中汲取经验。

首先，社会变革正在加速发生，而随着社会的飞速发展，设计在我们当今社会中的作用日益突显。其二，现在是我们能对过去所犯下的错误进行反思的时候了，19世纪英国的快速工业化发展留下的历史教训应为今天的中国以及其他亚洲国家带来启示。今天我们反思过去的错误，是因为我们今天能比过去做得更好。所以在地理设计时代，我们应审慎地思考未来究竟应该如何？地理设计能为设计的艺术与科学方面都提供支持，GIS则提供了一种新的语言——一种关于空间思维的语言——为这两种文化的联系建立起了桥梁，GIS成为表述这种语言的技术手段。

但我们如何将这一切转变为现实呢？首先，要继续发展工具，包括美学方面的绘图和可视化工具、科学方面的分析及模拟工具，以及在线合作工具。其次，是构建学术界内部的联系。地理设计是美学和科学的结合，但在传统的学术架构之内实现这样的联姻并不容易。我认为可行的方式是在现有的学术框架内通过跨学科的合作来建立桥梁。地理设计也是对当代问题作出的迅速回应，其以空间思维语言作为支撑，并最终会带来美学与科学在地理设计中的结合。

10-1



10-2

10. 海洋建模项目屏幕截图 © Will McClintock, University of California, Santa Barbara
10. Screen shot of the Sea Sketch Project © Will McClintock, University of California, Santa Barbara

I would like to talk about the benefits of geodesign and its broader contexts, particularly within the academia. We have already heard several definitions of geodesign, so I simply want to reiterate Carl Steinitz's definition, which is beautifully succinct: geodesign is changing geography by design. I have also proposed to define geodesign in this way: GIS is about what is, geodesign is about what could be. But there is also Jack Dangermond's very succinct definition: geodesign is designing with nature in mind. All of these lead us to think of geodesign, particularly with GIS, as collaboration between design and geography. It is about intervening in the world, but based on good scientific principles. It is maybe a part of landscape architecture, but in the academy landscape architecture has not traditionally been an important part of the sciences, or in Carl Steinitz's term the geographical sciences.

Here is an example from my own campus, the University of California, Santa Barbara. The "Sea Sketch Project" used the idea of geodesign in a marine-design context. The specific problem here is the movement of shipping through the Santa Barbara Channel between the mainland and the Channel Islands. Major container ships from Shenzhen, Busan, and other Asian ports come through the channel, because it is the cheapest route, and they run into conflict with whales,

particularly the Blue Whale, the largest mammal on the planet. Geodesign has been used here to try to balance the objectives of ships delivering goods to Los Angeles on the one hand, and minimizing environmental impact on the other. So as in many geodesign projects, this one includes sketch, working with a map to seek alternatives; and some fairly detailed evaluations of the various possible routes for the ships. The Sea Sketch Project makes use of GIS and the Internet to bring together the stakeholders, decision-makers, scientists, global citizens, and individuals. So I like to think of geodesign in the context of GIS as having two very closely related parts: on the left-hand side the actions of sketching and recording; on the right-hand side, evaluating, analyzing, predicting, modifying, and improving. The left-hand side is dominated by human esthetics; the right-hand side is dominated by science. It is that symbiosis between the creative and the scientific, which to me is very much the core of geodesign.

So what is the promise of geodesign, this potential bridge between the humanities and the sciences? The promise of geodesign is to implement scientific knowledge in a decision-making context, in other words to take science into the real world: to intervene, and to employ scientific knowledge in doing so. Then what is the barrier to this vision? Primarily, the organization of academy makes bridging the various parts very difficult. In many American universities, the organizational structure separates the humanities and the sciences under different deans, and perhaps even in different colleges. One of the biggest difficulties concerns promotion and tenure. In the humanities, creative scholarly activity is measured primarily through books, exhibitions, and performances; whereas the sciences place almost all emphasis on referee articles, in journals or conference proceedings. And these two sets of criteria have no intersection; yet geodesign requires us to bridge these two different worlds.

In 1959, prominent British novelist Charles Percy Snow wrote about the gap between the thinking of the sciences and humanities, and lack of a common language between them, under the rubric *The Two Cultures*. These are very much old debates, so why revisit them now? Does geodesign have promise, or will it simply fade away with time? I think there are some very good reasons for believing that bridging the cultures is finally possible, and that geodesign will succeed where previous efforts have failed.

One because the rate of changes accelerating, society advancing faster than never before, and design issues become more and more prominent as the fast society advances. Secondly, because I think we are able to see from the mistakes of the past and thinking particularly of the very rapid industrialization of Britain that occurred in the 19th century, in some ways has historical echo what is happening in China today, in many other parts of Asia. We can look back now to see the mistake of the past, and because today we know how to do better. So in the age of geodesign, we really need to think very seriously about its promise. Geodesign is able to provide tools that can support both the aesthetic and scientific aspects of design. GIS provides a new language — the language of spatial thinking — that can provide the bridge between these two cultures; and a technology that speaks that language.

How do we realize the promise? First, by continuing to develop tools: for sketch and visualization, for evaluation and simulation, for online collaboration. Second, by building bridges within the academia. Geodesign is the marriage of the esthetic and the scientific, but such marriages are not easily arranged, within the traditional academy. The feasible way to build bridges in the academy today is through cross-cutting centers. Geodesign is a timely response to current conditions, and underpinning it is the language of spatial thinking, leading ultimately to the integration of the esthetic and the scientific within geodesign.

地理设计：促进欧洲可持续与精明发展
Geodesigning a more Sustainable and Smarter Europe

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新的决策往往不是由学术界人士做出的，但他们是做出决策的驱动力。

New policy is not made by academics, but they are the drivers.

地理设计的优化：主动或被动？
Optimization in Geodesign: Slavery or Sovereignty?

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时间是有限的，我们面临的复杂问题也许有着无限的可能性。“最优化”并非真正的最佳解，但它能够便捷地提供多种选择方案，从而让我们避免浪费时间。

Time is finite, but the complex problems we face may have an infinite number of possible outcomes. The “optimization” may not be the best overall option, but it does not waste time and allows for multiple options to be easily generated.

城市区域的地理设计
Geodesign for City Region

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在设计中，我们有各种方式可以选择和采用，有很强大的工具可以使用，尤其是在大尺度的地区规划中。我并不认为我们是被技术所奴役，如果我们能够主动地去寻求改变的话。

There are many design methods we could adopt, we have multiple and powerful tools at our disposal, especially for large-scale regional planning. Therefore, I do not think we are enslaved by technology if we are actively seeking positive change.

地理设计框架在城市更新规划中的应用——以日本福岛县相马市为例
Geodesign Framework for Restoration Planning in Soma City, Fukushima Prefecture

矢野桂司
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2011年3月，日本东北部地区遭受了一场巨大的灾难。数千人丧生，基础设施被毁坏，海啸还造成了一系列的核事故。我们将地理设计的框架应用在这些区域的重建规划中。

In March 2011, a huge disaster struck northeastern Japan. In addition to the enormous loss of life and destruction of infrastructure, the tsunami caused a serious nuclear accident. We have adopted geodesign for restoration planning in these regions.

CityEngine在城市规划中的应用——即时城市
Using CityEngine for Urban Planning — the Instant City

艾略特 · 哈特利
Elliot HARTLEY
英国Garsdale设计工作室主管
Director of Garsdale Design Limited

快速的决策不能以牺牲决策质量为代价。通过包括CityEngine软件在内的多种地理设计工具，我们可以随时跟踪并反馈决策。

Quick decision-making cannot be at the expense of quality. There are many tools, such as “CityEngine”, that could help us track and gather decision-making feedback.

地理设计：扩展我们视野的4个维度
Geodesign: Expanding Our Vision in Four Dimensions

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对于地理设计这一概念的解释有很多版本，也许我在这里给出的定义并不是最佳的，却是最简洁的：地理设计是指在地理空间中的设计行为。

弗兰克·劳埃德·赖特64岁时受埃德加·考夫曼的委托，在宾夕法尼亚州的熊跑溪设计了一处别墅，这座别墅即为著名的流水别墅。赖特仅用了3个小时就完成了这个项目的草图。我的问题是：赖特所做的设计可以称之为地理设计吗？答案可以是肯定的，因为赖特在做这项设计时，将场地的地理环境纳入了考量范围之内：原有的巨石如何来支持起房屋，建筑与瀑布的关系如何，怎样才能拥有绝佳的视角，如何利用自然通风来降低夏季室内的温度。但答案也可以是否定的，因为赖特所做的一切都是在想象空间中完成的，而非在地理空间中。所以答案肯定与否在于你看待这个问题的视角，但重点并不在答案本身。

我们需要意识到的重要一点是，当我们在想象空间中进行设计时，我们的记忆力非常有限。心理学家乔治·米勒在大约50年前写了一篇名为《神奇数字7±2》的文章，来说明人在加工处理信息方面的局限性，他发现一个普通人能同时处理大约7件事。如果你的大脑只能同时处理7件左右的事，要在想象空间中进行地理设计几乎是不可能的。数字技术扩展了我们的记忆能力，也提高了我们的分析能力。例如我们能利用数字技术从环境、开发、能源的视角来分别看待区域和城市规划。但在这里，我希望能进一步超越这种传统的对于地理设计的思考方式，从4个维度，或者说4条线索来探讨地理设计。

首先，在世界人口不断膨胀的今天，农村向城市转变这一趋势分外重要。对于GIS而言，它的发展起源于对自然资源的信息化，针对于乡村及环境的情况；后来GIS开始被应用于城市规划领域；如今，也通过采用诸如CityEngine的程序而被应用于城市设计的领域中。因此，在农村向城市转移这一趋势之下，我们需要建立一套关于城市的知识基础。

第二，我想对我们所谈论的地理空间进行重新定义。当我们思考地理空间时，我们往往会将其视为一张平面图，或更深入地考虑到地形图，或者将其他地图叠加其上以表述不同的情况。我认为我们应扩展思维，对三维的地理空间进行思考，对整个星球的生命带进行思考，也就是将地表之下、之上以及上空所有的地球生命赖以维系的要素都纳入考量，将物理、生物、社会以及经济方面的信息都涵盖在内。这就是我所定义的地理空间——整个星球的三维生命带。

第三条线索是从数据、分析向设计的转化。设计的组织通常包含3个方面：获取与理解数据和信息，根据不同的目的来分析信息，基于以上数据与分析对产品和服务的创造和再创造，我将其称之为设计。目前来说，GIS技术已成为管理地理空间信息的有效工具，同时GIS也提供了信息分析的工具，但鲜有能帮助我们设计的工具。例如，在美国有一个“公共土地转让”组织，他们提出了被称之为“绿色足迹”的理念，旨在保护城市中那些关键的绿色地块，他们将这些地块收购并转售给政府或其他组织。为了实现这些愿景，他们建立了一个区域的GIS基础数据库，并利用GIS中基于地理过程的工具对这些信息进行分析，并最终用手绘的方式来绘制土地购置规划图。GIS技术已经超越了设计工作一般的能力需要。

对于什么是设计这一问题，有着各种各样的定义。以我作为一名设计师的经验而言，我认为设计是一个创造实体的思维过程。实体可以是一个物质对象，也可以是发生在某一特定时间点的事件，一个概念，或者一种关系。如果从这个层面上来说，那么所有的人都是设计师，每个人都对我们生活环境的创造负有责任。但我们忽略了重要的一点——什么才是好的设计？在我看来，评判标准在于设计意图中的设计伦理。无论是设计一个咖啡杯，一座城市，一个国家的边界，设计意图都是共通的。设计是为了创造更加便利的生活。这看起来是一个简单的伦理，但是如果我们继续追问设计是为了谁的生活？为哪些物种的生活？何时是恰当的时机？这个问题就将变得极为复杂。当我们在设计的过程中思考这些问题时，我们就能建立起评判项目好坏的设计伦理。而这正是我们在学术界、在实践中、在技术上所缺失的。我们在发展和完善GIS技术，发展地理设计的概念的时候，应更多地关注设计伦理的建立。

因此，我们需要相应的技术支持。这包括新的空间信息模型、创作工具、推理工具、视觉化工具、地理过程工具、反馈工具、预景工具、交互操作工具等。

最后，我想分别谈谈我们所面临的三大挑战。对于技术人员

的挑战是研发出以设计为中心的软件，也就是说，软件要为设计师所用，让设计师能够像使用笔和纸一样便捷地使用这些软件，并能够支撑整个地理设计流程。对于高校而言，不能仅仅将地理设计视为一个时髦的词汇，而应将地理设计视为一个更广阔的议题。高校的教师及学生，不应仅仅是批判者，更应该是具有责任感的创造者。对于从业者而言，应更好地将地理设计应用于实践中，并反馈给技术人员，哪些技术是有效的，哪些是无效的。

地理设计的未来在哪里，我并不知道，但就像林肯说过的：预测未来最好的方式就是去创造它。

11. 由CityEngine生成的效果图
11. The image produced by CityEngine

There are many definitions of geodesign, but I will give another one. It is not the best but the simplest: “Geodesign is the design in geographic space”.

When Frank Lloyd Wright was 64 years old, he was asked by Edgar Kaufmann to design a cabin for him in Bear Run, Pennsylvania. The cabin that Wright designed was Fallingwater, he designed the house in 3 hours. Now the question is, was Frank Lloyd Wright doing geodesign? One answer is yes, because as he did the design of Fallingwater, he had the site in mind, where the boulders were that support the house, where the waterfall was, how to handle the views, and how to bring the cool air into the house in summer. You could also say no, because he was doing all that in mental space, rather than in geographic space. So the answer to the question could be yes or no depending on your point of view. It is really not important how you answer the question.

However, it is important to recognize that when you are designing something in mental space, you are limited to what you can remember. You might recall the paper titled “The Magic Number Seven Plus or Minus Two”, by George Miller, written about 50 years ago. He found out that an average person could keep tract of about 7 things. So the idea of doing geodesign in mental space is almost impossible if your mind is limited to 7 plus or minus 2 variables. Digital technology can expand our memory and in so doing improve our analytical capabilities. We can apply digital technology to regional and urban planning, from an environment perspective, from a development perspective, or from an energy perspective. But I would like to go beyond this more traditional view of geodesign, by discussing four dimensions or four lines of thinking.

Firstly, the shift from rural to urban is important because the expanding population of the world today. GIS was in past started with natural resources information dealing with rural and environmental conditions. Later GIS began to be applied to urban planning, and now is likely to be applied to urban design, using programs like CityEngine. So, we need to build a knowledge base about cities.

Secondly, I would like to redefine what we mean when we refer to geographic space. When we talk about geographic space many of us think of a flat map, if we are more sophisticated we might think in terms of relief map, or draping other maps on top to show different conditions. I think we need to expand our thinking and think about 3D geographic space, we need to think about the planet’s life zone, including everything that lies below, on, and above the surface of the earth that supports life, including physical, biological, social and economic information. So this is what I now define as geographic space — the 3D life zone around the planet.

Thirdly, the shift from data and analysis to design is another line of thought. The nature of design organizations involves three things: the acquisition and understanding of the data and information, analyzing that information with multiple purposes, and the creation or recreation of goods and services based on that data and analysis, what I called design. At present, GIS technology is good at managing geographic information. GIS also provides a number of tools for analyzing information, but it provides very few tools to help us do design. So for example, there is an organization in America called the Trust for Public

Land (TPL), and they create what they call “Greenprints”, which are plans showing what land should be conserved. They identify where they should buy property for conservation and then sell that property to the government or other organizations. To do this, they build a GIS database for a region, analyzed that information using geo-processing tools in GIS, and then draw the land acquisition plan by hand. So I think GIS technology has skipped the usual ability to do the design work.

So what is design? There are many definitions, but here is one that I have formed from my own experience as a designer: Design is a thought process comprising the creation of an entity. What is an entity? It could be a physical object, an event that occurs in time, a concept, or a relationship. So if you think about this, we are all designers, we are all responsible for designing the entities in and around our lives. But there is something missing. How do you know if your design is good or bad? It is my contention that the ethic for a design is found in the purpose of design. And no matter what we are designing, from designing a coffee cup, a city, and a boundary for a country, the purpose of design is always the same. The purpose of design is to facilitate life. This sounds like a simple ethic until you ask whose life, which species, and what is the appropriate time. It becomes quite complicated if you try to answer these questions. But as you ask these questions for your project, you will develop the design ethic for your project, that design ethic you use to determine if your design is good or bad. This type of thinking is missing in practice, in academia, and in technology. We need to give more attention to developing our design ethics, as we develop and comprehend GIS and as we develop our understanding of geodesign.

This requires responsive technology, including new spatial data models, creation tools, inference engines, visualization tools, geo-processing tools, scenario management tools, and interoperability tools.

So there are three challenges for us. For technologists, the challenge is to produce design-centric software, that is, software should be designed for designers, that is as easy to use as pencil and paper, supporting entire geodesign workflow. Our universities need move beyond the use of geodesign as a catch phrase. Teachers and students not only need to learn how to be critical thinkers, but also to be responsible creators. And finally, our practitioners need to apply the technology and the way of thinking about geodesign, and then tell us what works and what does not work.

So what is the future of geodesign? I do not know. But as Abraham Lincoln once said: “The best way to predict the future is to create it”.

复杂性的表达
Representing Complexity

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为了使地理设计帮助我们进一步改善工作，应对生态系统服务和更富创造性的设计给予重点关注。近年来发生的各种自然灾难告诉我们，地球是一个非常脆弱的星球；而地理设计可以帮助我们适应地球的脆弱环境，为子孙后代创造一个更加宜居的环境。
In order for geodesign to help us further improve our design work, we should focus on ecosystem services and creative design. In recent years, various natural disasters have indicated that the earth is a very fragile planet. Geodesign could help us to adapt to the earth to create a more livable environment for future generations.

地理设计作为思考过程——两种不同的方案
Geodesign as a Process of Thinking — Two Opposite Approaches

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地理设计不只是对土地进行规划和设计，而是一种能促使我们每个人的观点和观念产生改变的方法。可持续性的内涵应该包括社会的适应力和弹性，从而引导我们建立更完善的社会。
Geodesign is not just planning and designing on the land, but a methodology to enhance our views and ideas. Ideas of sustainability should include social resilience and flexibility, both of which will guide us to build a better society.

地理设计：生存的艺术
Geodesign for Survival

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地理设计是一门关于生存的艺术，需要我们以系统化的方式来解决问题。现在正是变革的时期。我们需要找到更好的方法解决环境问题；需要在地理设计中寻找新的方法将不同学科进行整合；需要更多的生态学家、建筑师来改变我们的景观，拯救我们的地球，建设美丽中国！

Geodesign is an art of survival. We need to use it to systematically inform and solve problems. Now it is the time for change. We need to find better ways to solve environmental problems; to find new ways in geodesign to integrate disciplines. We need more ecologists and architects to design our landscapes and cities, to save our earth and construct a more beautiful China!

地理设计系统
A System for Geodesign

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关于地理设计有很多定义，但我们尚未对此达成共识。地理设计是一种环境设计，通常包括广大的区域、复杂的问题和多人的团队。地理设计通过数字计算、运算流程和通信技术来促进协作化、信息化的设计项目，并通过设计模拟和系统化的思考方式获得及时的反馈。地理设计的要点可概括为三个C：复杂性（Complexity）、算法（Computation）和合作（Collaboration）。我并不认为弗兰克·劳埃德·赖特用3小时的草图绘制所完成的流水别墅属于地理设计的范畴。我们需要一个新的词汇来对地理设计和非地理设计进行定义和区分。在我看来，这三个C缺一不可。

首先，我想谈一谈什么是复杂性。目前一些科技企业，比如美国国家科学基金会，他们投入了大量的金钱和精力对生物复杂性进行研究，所谓生物复杂性包括微观的细胞之间的联系、动物与栖息地之间的关系，以及人类与生态系统甚至行星功能之间的联系。这其中的关系非常复杂，包括不同尺度的组织之间的演变。我认为在未来的10年间，对生物复杂性的研究将成为地理设计中一个非常重要的方面。

地理设计系统实际上是一个支持并促进地理设计过程的体系。它不仅仅是GIS，也不仅仅是CAD——我们今天所做的地理设计肯定需要上述两种软件，但也需要更多软件技术的支持。地理设计也不只是一种“地理设计软件”。因为我认为那是20世纪的模型软件，而本世纪的模型来自于一个完全不同的环境——手机中所装的各种“应用程序”将成为建模基础。这些不同类型的工具都是景观设计师、土地规划师和工程师在进行地理设计时所需的。例如我的手机上就装有GIS、Auto-CAD、Skype，而且这些应用程序可以以非常有趣而重要的方式进行组合应用。

为了更好地理解地理设计，我将地理设计的支持系统分解为句法、语义和机制，共15个范畴（图1）。接下来我将对它们分别进行阐述。

（1）底图。底图通常包含场地现有的条件和环境，它们在项目的设计过程中被认定为是恒定的（不变的）元素，能够对地理设计进行定位和校准。我们需要用其对那些位于将会发生改变的信息之上的不变的信息进行追踪。

（2）对象。通常是指我们能够通过设计改变的单一或组合元素，这些要素可以是全新引入的，也可以来自场地。这些对象会具有名称、属性以及行为方式，对象之间具备类别和层级的关系（其中一种或其中一部分的关系）。

（3）布局。布局是指“对象排列”，包括对象在三维空间中的位置、“真实世界”中的坐标及其几何属性（大小、高度、色彩等）。我们有时以行为单位种树，有时以圆圈形式种树，有时以小树林形式种树，有时随机种树，还有时通过媒介或参数化过程种树。这就是CAD等软件所完成的工作，即为在进行几何布局。

（4）限制。我将对象之间的规则和关系称之为“限制”。例如，道路的两侧应该是平行的，如果你移动其中一侧，另一侧也应随之移动。树木应根据道路走向进行栽植，如果道路发生弯曲，树木的排列也应随之变化。以上关系在设计中是非常普遍的——房屋面向北方，庭院通常位于房屋的左侧，屋顶的坡度最小为30°——但以上关系很难被嵌入软件中。然而某些软件已能够实现这一嵌入过程，如某些CAD系统、BIM环境和GIS系统。

（5）信息库。有时需要对信息进行保存和检索，从而能够实现信息的再利用以及从以往信息或其他信息中借鉴。信息检索科学在过去10年间已经取得了很大的进展。将有序的、可搜寻的、可共享的对象整合在一起，则称之为信息库，同时考虑其布局和限制因子，从而为地理设计提供参考。

（6）合作。合作已成为我们目前工作的核心，而不再是每个人在各自的电脑前埋头工作。世界上存在一条著名的生态规则：所有的事物都是相互关联的。在我们的世界中，同样需要设计师之间进行相互沟通，以及与工程学、政治学、社区等领域的专业人士进行各个方面的合作。这对于我们正在谈论的地理设计而言非常关键。

（7）版本。“版本控制”系统已成为现代软件工程领域中必不可少的一部分，在地理设计中也是如此。我们能够通过视频会议、电话、共享工作空间和环境等方式同步地开展工作，或通过来回传递的方式非同步地开展工作。并且能够通过各种工具和技术，对一个或多个设计的不同的、连续的、分散的“版本”进行管理。

（8）抽象的等级。设计通常都是一些抽象的概念。比如我想营造一种围合感，这就是一个抽象的概念。它有可能是一座砖墙，有可能是一道围栏，也可能是一排树木。以上每一个例子都实现了围合感这一抽象概念。在设计过程中，我们会将这些既高度抽象又非常具体的概念整合在一起。这就像是一种跨尺度，但并不完全一致，因为每一个概念都会涉及到一定的抽象等级。

（9）分析图。二维空间中最典型的抽象概念就是图形，我们称之为分析图，设计中到处都需要用到分析图。我们一般通过圆圈和箭头表达其中的含义和关系。

（10）超链接。在现代网络中，超链接能够在元素和媒体之间提供一键式链接，或嵌入某一元素、某个地方的实时视频、某一事件等的相关信息。GPS、图纸、图表、地图和规划能够与真实的世界之间形成链接，通过这些传感器能够获知温度和交通时速。这是获得我们所需的地理设计文件的一个重要方面。

（11）模型和脚本。模型和脚本是计算的语言。无论是我们所谈论的C++、.Net 、Java 或其他计算机语言，都能够实现不同学科之间的交流。

（12）时间。时间是地理设计的基本构建组块，无论对于设计过程还是现实世界中的设计来说均如此。对于时间的追踪、管理和记录在模拟、合作、版本管理和某些类型的限制方面都是非常重要的。

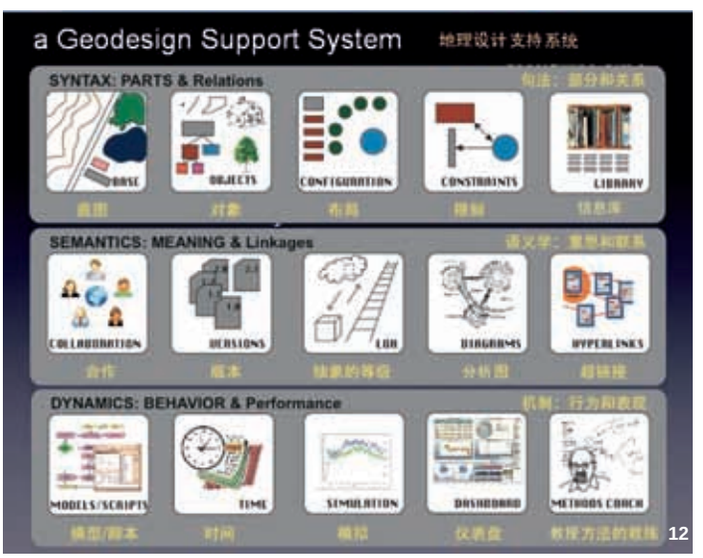
（13）模拟。模拟是获得模型的关键。模拟工具使得地理设计师能够随时间的推移或在不同的场景下，对其设计方案或产品进行测试。不断更新输入和输出信息的动态系统模型是地理设计必不可少的环节。而且目前这种通过模拟的方式进行操作的流程已经变得越来越强大，也能够更好地解决生物复杂性的问题。我们必须要应对这些问题，并且对此承担责任。

（14）仪表盘。仪表盘能够为关键绩效指标提供“一目了然”的指示，这些指示建立在简单的指标或更复杂的模拟和评估基础之上，能够为非同步的地理设计提供实时的指导。我们有很多标准；我们需要各种方式来连接有趣的显示，而不仅仅是仪表和转盘。

（15）教授方法的教练。正像卡尔·斯坦尼兹教授所说：设计有很多种方法，一个经验丰富的设计师能够判断所选择的方法是否适用于某一个特定的问题，能够对进展进行评估，并对方法提出建议或进行组合。一个内置的训练模块能够在地理设计支持系统中提供相同的指导。

地理设计是本世纪的一个热点。各个方面都需要利用这一技术，每天世界各地都在召开各种会议，大家都在探讨如何在教育课程中增设地理设计这门课程。我们积极地参与这些过程并希望能够在教育、实践和研究中确定地理设计的作用。现在，我们需要更广泛的工具和参与者加入地理设计这个学科中来。我在此预测，他们所从事的大部分研究都将纳入我所描述的15个范畴之内。

12. 地理设计支持系统的15个范畴
12. The 15 areas of a Geodesign Support System



We have many definitions of geodesign. I do not think we have settled on one yet. Geodesign is environmental design, usually involving large areas, complex issues, and multi-person teams. It leverages the powers of digital computing, algorithmic processes, and communications technologies to foster collaborative, information-based design projects, that depend upon timely feedback about implications of proposed designs by simulation and informed by systems-thinking. Geodesign has three Cs (Complexity, Computation, and Collaboration). I do not think Frank Lloyd Wright was doing geodesign in his three hours sketch exercise, to design Falling Water with tracing paper at the time that he did it. I think we need a new term, which defines and helps to differentiate geodesign from non-geodesign. In my view, you need all three Cs — just two does not make it.

First, I want to say a little bit about complexity. In our science enterprise right now, the national science foundation called NSF, is spending a lot of money, relatively, and a lot scientific research into this topic about Bio-complexity. Looking at the relationships between cells that are microscopic, and animals that we can see and the habitat that they live in, to the populations and eco-systems and even the planetary function. There are very complex relationships including evolution between the organizations at these different scales. I think the science of Bio-complexity will inform geodesign in very important ways in the next decade.

A geodesign system is a system that supports and enables geodesign processes. It is not just GIS, and it is not just CAD. It is at least those two things for sure, but also more. And it would not be just one piece of "geodesign software". Because I think that is the last century's model for software. This century's model comes from a very different environment — the "apps" we all have on our cellphones that will be the basis. I think, for the development of all kinds of tools that landscape architects and land planers and engineers doing geodesign need. I have GIS, Auto-CAD, Skype on my cellphone, and many of them are combining together in interesting and important ways.

In order to better understand geodesign, I will divide a Geodesign Support System into syntax, semantics and dynamics, a total of 15 areas (Fig. 1). Next, I will respectively elaborate on it.

(1) Base. The "base map" includes existing conditions and context, most of which are expected to be constant (unchanging) in the course of the design project, which serve to situate and calibrate the geodesign activities. We need to keep track of what we are not going to change on top of which we are going to change.

(2) Objects. The "elements of design" are subject to modification by design, either introduced de-novo, or found on site. "Objects" in the object-oriented sense, they have names, attributes, and behavior; and exist within an inheritance and group hierarchy ("kind-of" and "part of" relations).

(3) Configuration. It is the "arrangement of objects" — their locations in 3-space, in "real-world" coordinates, as well as their geometric properties — size, height, color, etc. Sometimes we plant trees in rows, and sometimes in circles, and sometimes in groves, and sometime by randomly distributing them, and sometimes we have agency or parametric processes that create these. This is what CADs do. It is making geometric arrangements.

(4) Constraints. To the rules and relationship between objects are what I call constraints. For example, the two side of the road should be parallel, if you move one side, the other side should move with it. The road trees should run with the road, so the road curves, the line of trees should also curve. These kinds of relationships are very ordinary in design — houses face north, courtyard always on the left, roof slope must at least 30 degrees — but still very hard to embed in software. Some are become possible, some CAD systems, some BIM environments, some GIS are able to embed these relationships.

(5) Library. Sometimes we need to save and retrieve information, so as to be able to re-use and learn from the past, or from others. The information retrieval science was in huge progress in the last decade. Library is organized, search-able, share-able collections of objects, as well as configurations and constraints, which can be used as reference for geodesign.

(6) Collaboration. The collaboration has become in an essential keys of what we do and no longer individuals working only on their computer. There is a famous ecological law that says everything is connected to everything, and in that environment, we also need designers who are connected one to the other, and also with engineering and political science and community leaders and all the other parts of collaboration. That is essential to the geodesign that we are talking about.

(7) Versions. "Version-control" systems have become essential in modern software engineering; no less so in geodesign. Through video conference, tele-presence, shared work space and environments, we can work together synchronously, on the same drawing, or asynchronously

passing back and forth. Tools and techniques can be used to manage multiple, sequential and divergent "versions" of one or more designs.

(8) Levels of abstraction. In many ways, design is often about some abstract idea, for example: "I want something, which gives us a sense of an enclosure". That is an abstract idea. It could be a brick wall; it could be a fence; it could be a row of trees. Each of those instances is achieving the abstract concept of enclosure. In the design processes, we work with all of these kinds of ideas, both very highly abstract and very concrete, always integrating together. It is kind of like across scales but it is not the same, you will have a very large or small thing at either level of that abstraction.

(9) Diagrams. The very particular example of an abstract concept embedded in a 2D space is graphic, we call that diagrams, which are ubiquitous in design. We often use circles and arrows to express the implications and relations.

(10) Hyperlinks. Hyperlinks, in the modern WWW web interface, provide "one-click" linkages between elements and media; embedding related information about an element, or a live video of a place or event, etc. GPS and otherwise our drawings, our diagrams, our maps and plans can have links back to the real analog world as represented by sensors: what is the temperature, what is the traffic speed now. And that is an important piece of making the live geo design documents that we need.

(11) Models and scripts. Models and scripts are the language of computation. Computer languages, whether we are talking about C++ or dot net or java or any other language, are the way of shared communication between disciplines.

(12) Time. Time is a fundamental building block of geodesign; both for the design process, and for designs in place in the real world. Tracking, managing and recording time is essential for simulations, for collaboration, for version-management, and for some kinds of constraints.

(13) Simulation. Simulation is the key to getting the impact models. Simulation tools enable geo-designers to virtually test proposals and their performance / behavior over time, or under various scenarios. Models of dynamic systems with inputs and outputs tracked over time and varying conditions are essential for geodesign. They are hard to draw under any circumstances, but increasingly capable of being modeled and simulated overtime, especially as we begin to unravel mysteries of bio-complexity. We will find nested simulation systems at all different scales that we need to be responsive to and responsible for.

(14) Dashboards. Dashboards provide "at-a-glance" displays of key performance indicators, that can be based on simple metrics or more complex simulations and evaluations, and that can guide real-time as well as asynchronous geodesign. We have many criteria; we need ways of connecting up interesting displays not just gauges and dials.

(15) Methods Coach. As professor Carl Steinitz mentioned: there are many ways to design. An experienced designer can judge whether a chosen method fits a particular problem; and can evaluate how progress is going and may suggest changing or combining methods. A built-in methods coach module can provide this same guidance in a geodesign support system.

Geodesign is clearly the word of the day, the week, the century. It is exploding in many ways — conferences like this all around the world increasingly in the curriculum in education. And as we all engage in these processes and hope to define its role in our processes of education and of practice and of research. We need access to wide range of tools and helpers. My prediction is that many of them will fall into the fifteen categories I have described.

飞行员的归来
The Return of the Aviators

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在历史中的某一时期，人们可以通过低速飞行，采用一种与今日截然不同的方式来探索世界。如今我们已经不再渴望成为一名飞行员。我们坐在金属机舱中飞越地球，而不再投眸于大地，我们所做的一切仅仅是从一个时区飞越到另一个时区。为什么我要在此谈论飞行员，也许在座的没有一位能够驾驶自己的飞机来俯瞰大地。事实上，我认为飞行员不仅见证了现代航空的历史，也从上空见证了地球上所发生的变化。作为一名飞行员，也是在对景观未来的发展进行思考。我不认同今天所探讨的地理设计应集中在对高科技或低科技，大数据或小数据的讨论上。今天我们所讨论的焦点应该是数据匮乏环境中的景观。实际上，我认为与

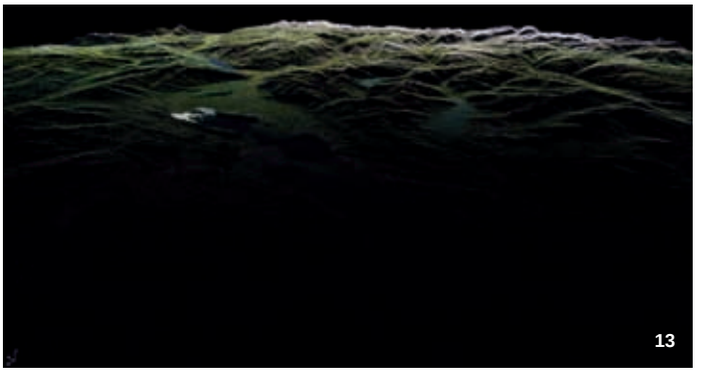
飞行相关的技术与我们在一个具体项目及其地形勘测中所采用的技术截然不同。

我将在此展示整个苏黎世联邦理工学院团队的工作成果。我们的团队以瑞士苏黎世和新加坡为研究基地。这项工作起源于詹姆斯·梅尔索姆（景观建模与可视化实验室组长）与苏黎世联邦理工学院景观与城市规划系系主任阿德里安娜·格瑞特–瑞格曼教授的一项合作。

图中展示了位于瑞士苏黎世湖南侧的林特平原的总体三维地形图，在山脚有一个白色的小点（图13），它代表一个被输入更大的瑞士地形网格之中的点云集。在一种高地理精度之下实现点云与地形网格之间的转化正是我们最感兴趣的部分。这些点分布得非常密集，相关数据通过高精度地面专用激光器或小型无人飞行器采集而来。但关键在于将本地信息输入一个诸如瑞士地形系统这样的更加广阔的地理信息系统之中，我认为这才是讨论的焦点所在。谷歌及其类似的地理系统一直在为我们提供越来越丰富的本地化信息，单位面积或某一地点内获得的点状信息也越来越多。我认为这正是建模的未来所趋。我相信，通过使用可以在任何情况下对点云数据集进行采集的无人机和激光扫描仪，我们能够逐步收集场地信息。这就是目前世界上许多地方正在发生的情况，而且这种情形将会持续发生，这正预示着“飞行员的归来”。因此我认为在座的每一位，特别是年轻的学子们，应尽快适应这种情况，特别要对有关云集、点云概念下的景观进行思考。

图中展示的是詹姆斯·梅尔索姆正在应用他的小型景观测量工具（图14）。无人机一经发射成功后，他仅需要通过一台笔记本就能追踪飞行航线和收集飞行数据。眼前的一些都能够进行测量，你所选择的飞行路线将提供宝贵的附加数据。这正是身为飞行员的好处所在：作为一名景观设计师，如果你无法获得某一既定地点的准确信息，你只需要发射无人机去采集数据即可。这不仅是一场科技革命，而是一场概念革命，它将从根本上改变我们思考和处理景观的方式。景观设计师再次成为一名飞行员，如同早期先锋时代的英雄。作为一名飞行员，意味着要改变我们的调查方式，并走出去从空中的各个角度来俯瞰场地。

接下来我将为大家展示一些案例。这是位于瑞士阿尔卑斯山的圣哥达山口的点云集合（图15），该项目将在2014威尼斯双年展上展出。我们通过放飞小型无人机在场地上进行数据采集，为圣哥达山口创建了一套点云数据集。我们使用了三种点云收集设备来获得数据集，包括一个移动雷达装置、一个工作范围达1.5km的地面激光扫描仪，以及能够完成空中侦察的无人机。如果你仔细观察不同的点云集，你将发现自己创造了一组非常精确的地形



13. 图中的白色小点代表一个可被输入瑞士地形网格之中的点云集。
13. The little white point represents a point cloud set that can be riveted into the Swiss Topomesh.

信息。这项飞行员技术最引人入胜之处就在于它使得人们可以在不同的尺度上工作。在各种尺度中进行方法转换的问题变得更加具有相对性，也将不再成为一个难题。

100年以前，景观设计师通常会带着水彩、画笔和一块“克劳德镜”来描绘他们所感知的景观。而现在你只需要带上飞行器和笔记本电脑，就能收集到更多的信息。将飞行器扔上天，然后就能够获得想要的数据。尽管我在此展示的这些技术非常复杂，但它能够以某种方式与项目设计相结合，这将是非常具有启发性的。点云数据集将促使你创造一系列不同的事物。举例来说，在圣哥达山口数据集中，我们能够放大或缩小路森祝大坝的细节信息。例如，你会从信息中看到这座修建于第二次世界大战时期——当时混凝土还属于稀缺材料——的大坝所具有的钢筋结构细节。大坝的地理位置图如同X射线，你将直观地看到大坝是怎样以一种非常高的精度矗立在阿尔卑斯山境内。实际上，使用无人机和点云是一种从三维视角来了解地理设计的非常奇妙的方式。这就是谈论“飞行员的归来”的原因所在，景观设计师如同一只雄鹰，能够降落或盘旋于某一特定场地的任意地方。

作为一个展示点云数据集运行能力的例证，我参与了尼尔铁路项目——一条穿越阿尔卑斯山的高速隧道的修建，该项目产生了大量工程废料。我们目前正在处理350万立方米的废料，这些废料应被放置在山上，而非山谷的平坦场地中。用于修筑高150m的人工堤坝的挖掘材料的不稳定性导致这个项目变得异常复杂。点云数据集的精度能够满足了解自然山坡的崎岖地形之所需，因此能够在堤坝边坡的修筑中使用。所以我们的无人机和飞行员驶向了该场地。我们将机载点云与地面仪扫描相结合，并制作出现有的地形条件的精确模型。我们所提出的方案将人工堤坝的边缘简化为一个石笼台阶。这种改变被山地工程师所接受，工程师自身

的共享知识中不包含点云文化，而正是这种点云文化能够在工程师和景观设计师之间建立对话。

当与苏黎世联邦理工学院的学生共同在广阔的河流三角洲地区，如南荷兰省的多德雷赫特项目中工作时，我们遇到了规划和设计中的实际界限问题。所有在此展示的项目都被嵌入了一项由空中雷达提供的点云模型中，该模型在Z轴方向可精确到10cm。这种模型是一次设计革命，当时大多数设计师都对GIS一无所知，但他们很快学会了如何将点云应用于设计中。该项目模型能够在潮间带模拟洪水过程，通过展示水位上升3m的情况，整个洪水过程能够得到精确的呈现。多德雷赫特项目的有趣之处在于所生成的设计图片都是由能够生成模拟过程的模型库直接完成的。因此我们可以认为模型和图片之间没有差异，两者均来自于GIS。

我认为飞行员和无人机的关键在于它们能够在数据匮乏的环境中收集相关数据。在雅加达吉利翁河案例——一个与苏黎世联邦理工学院在新加坡的未来城市实验室合作的研究项目中，我们受到了缺乏可靠数据的挑战。雅加达即一个可被称为“数据匮乏环境”的代表，我们所获得的数据往往无法在现场得到验证。由于雅加达面临严峻的环境问题，没有人对每年的洪水情况进行调查，雅加达成为了被环境学家所遗忘的角落。而我们所感兴趣的就是从当地的地形和人民身上获得的数据。

为了提出一个可靠的景观方案，我们与苏黎世联邦理工学院的保罗·布兰多教授和阿德里安娜·格瑞特–瑞格曼教授以及新加坡国立大学的乔戈·瑞格迪克教授在多种尺度上开展了工作。我们的团队部署好无人机和其他的基本测量设备，包括佳明全球定位系统和莱卡激光测距仪，对场地进行了准确的测量。这项工作逐步建立起一个可用的数据集。同时我们也会对设计和新的工具进行思考。吉利翁河或许是雅加达缺少浪漫情调的地方，我们也称之为“塑料河”。河流中堆积着宽达6~8m的塑料沉积物。我们的研究表明河床已经完全塑化，雅加达每天有500吨的垃圾被弃至河中，这也是造成水灾的主要原因。在此我们展示了雅加达甘榜马来由地区的一个点云模型——一条穿城而过的宽60m的河道（图16）。我们建议对河流进行治理，并使其回归城市中心。我们与水利工程师以及景观设计师合作完成了点云模拟，对洪水和垃圾转移过程进行了模拟。这表明点云技术引发了一场技术革命。不仅能够将三维信息导入以点云数据库为基础的GIS中，还可以嵌入设计变量并对其进行测试。

我认为，飞行员的归来和地理定位的点云数据预示着景观设计行业的一场真正的概念革命！我的梦想就是将飞行员文化发扬光大，并向世界各地的不同合作群体传播。这项技术毫无疑问将提升我们改善所面临的环境问题的方式。

I believe there is a moment in history, when this sort of slowness of flight allowed us to discover and see the world in a very different way than today. We no longer think as aviators today. We travel instead in a metal tube to across the planet without looking at the earth. All we do now is to just cross time. So why am I talking about aviators here today. Probably none of you have piloted your own plane to take a look at the landscape. Actually I think that aviators not only witnessed the history of modern aviation, but also the change in perception of our planet as seen from above. Being an aviator then, was also about thinking about landscape futures. I do not think the discussion today about geodesign should focus so much on the discussion between high-tech or low-tech, or big data versus low data. What I am going to talk about today aims in fact at landscapes lying in data-poor environments, and I actually think that technology involving this way makes significant difference to the way we can approach a specific project and its terrain.

The work I am going to show you is actually the work of whole ETH team at my Chair. Our team is based both in Zurich, Switzerland and in Singapore. The origin of the work was begun with James Melsom who leads the LVML (Landscape Modeling and Visualizing Laboratory) at my Chair in close collaboration with Professor Adrienne Grêt-Regamey of the PLUS Chair at the ETH.

Looking at an overall Swiss Topo 3D view of the Linth Plain located south of Lake Zurich, you can see a little white spot at the base of the mountains (Fig. 13). It represents a point cloud set that has been riveted into the bigger Swiss Topomesh. The transfer of point clouds onto mesh with high geographic precision is what interests us most. The

14. 詹姆斯•梅尔索姆在林特平原上放飞无人机。
14. James Melsom deploys a drone in the Linth Plain.

points in such a data set can be more or less dense, some are done by the highly precise terrestrial laser scanners, and some are actually done with the little drones. But the point is about feeding local information into a much broader geographic information system like Swiss Topo. This is where I think that the whole discussion should focus today. Goggle and its approximate geographic system are always feeding us with more and more localized information, more and more points information per square meter and location. This I believe is where the future of modeling stands. I believe in the gradual accumulation of site information through the use of drones and laser scanners which can gather point cloud data sets of any situation. This is something that is happening right now in many parts of the world and is going to continuing happen, hence the "return of the aviators". Because I think that all of you, especially the young students, would better get with it, and start thinking about landscape in the terms of clouds, and point clouds more particularly.

This is a picture of James Melsom who leads the LVML. He is seen in action with this little landscape surveying kit (Fig. 14). Once he successfully launches his little drone airplane, the flight can be tracked on a simple laptop and data can be collected with the same device. Everything in sight can be measured, and the flight path that you choose feeds you with precious additional data. This is precisely the point about the aviator kit: as a landscape designer, if you are missing the right set of information for a given place, just go out, and get it. This is not only a technological revolution, but a conceptual revolution that will fundamentally change the way we actually look at and operate on landscapes. The landscape architect becomes an aviator again, in the true heroic sense of the early pioneer times. Being an aviator, means also to change our means of investigation and go out and look at a site from the above at all possible angles.

I am going to show some examples of the work done so far at the LVML and at Atelier Girot. This is the point cloud set corresponding to the St. Gotthard Pass in the Swiss Alps (Fig. 15), the project will be exhibited at the Biennale in Venice in 2014. We actually created a point cloud data set for the entire St. Gotthard Pass by flying our little drones with instruments on the mountain pass. To get the data set, we used the combination of three types of points cloud gathering techniques, including a mobile Lidar-unit, a terrestrial laser scanner with a 1.5 km range, and the Sense fly drones for aerial reconnaissance. If you really look closely at the different point cloud sets, you realize that they combine to create a set of very precise topographic information. What is fascinating about this sort of aviator technology is that it allows you to work though very different scales within a given site. The question of shifting methodologies through scales becomes more relative and is no longer such an issue.

One hundred years ago landscape architects used to go out with water colors, brush, and a "Claude Glass" to apprehend the landscape, now you simply go out with your drone and laptop and gather much more. Just throw the drone up in the air, and you can get the data sets that you really want. Although the technique shown here is highly sophisticated, it can be blended with an approach to project design that is rather heuristic. The point cloud data set allows you to create a variety of things. For instance in the St. Gottard Pass data set we can zoom-into a detail like the Lucendro Dam. The level of detail is such that you can actually see through the rib structure of the dam, which was done during the World War Two when concrete was scarce. This geographically positioned image of the dam works like an X-ray. You can literally see how objects stand on alpine territory with very high precision. Actually, the use of drones and point-clouds is a fascinating way to understanding geodesign in a three-dimensional way. This is why we speak of a return of the aviator, because the landscape architect feels like an eagle coming down and around on to any sector of a particular site.

As an example of the operational capabilities of a point cloud data set, I have participated in the NEAT (Neue Eisenbahn Alpen Transversal) project of a high speed connection across the Alps which generates a lot of materials. We are now dealing with 3 and half million cubic meters of material that needs to be placed on a mountain site and, not on the flat site of the valley. The project is extremely complex, and the excavation material used to make the 150 m tall artificial mound is very unstable. The precision of a point cloud data set matters when you have to engineer the slope of the mound as it meets the rough terrain of the natural mountain slope. So our drone and our aviator went out to the Sigirino site and threw the drone around. We combined airborn point clouds with terrestrial scans and produced an accurate model of the existing terrain conditions. The work we proposed reducing the edge condition of the artificial mound to a single gabion step. This move was accepted by the Alp Transit engineers, and it is the shared knowledge of the engineer themselves are not work in point clouds culture that enabled such constructive design dialogue between engineers and

landscape architects.

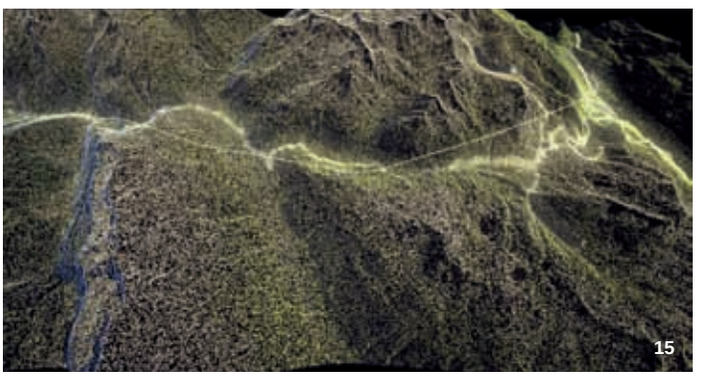
When working on vast river delta regions like the Dordrecht project in South Holland with ETH design students we touched upon the actual limits of planning and design. All the projects shown here were embedded in a vast point cloud model provided by an Aerial Lidar campaign which delivered 10 cm precision in the Z axis. This model was a revolution in studio, until then most designers were GIS ignorant, but they learned quickly how to incorporate point clouds in their design. The project model could generate floods corresponding to this intertidal zone. The whole flooding process could be simulated by precisely showing what a 3-meter rise in water would produce. What is interesting in the Dordrecht project is that the design images that were generated were actually done directly from the model base which could run the simulation. There was so to speak no difference between model and image, both were true to GIS reality.

I think the heart of the question with aviators and drones is about collecting appropriate data in data poor environments. After visiting to the Megacity of Jakarta and more particularly the case of the Ciliwung River, for a research project with the ETH Future Cities Laboratory in Singapore, we were challenged by an absence of reliable data. Jakarta is what we can call a data poor environment in that what we receive as data is not always verifiable on site. Jakarta has often been shunned by environmental researchers because of acute environment argument not to go and investigate the terrible flooding situation experiences each year. What was actually interesting in Jakarta is that we learned a lot from the terrain and the people.

We actually managed to work on a multi-scale of approach together with ETH Professor Paolo Burlando and ETH Professor Adrienne Grêt-Regamey as well as NUS Professor Jörg Rekittke in order to propose intermediate landscape scenarios that were plausible for the situation at hand. Our team deployed drones and other rudimentary measuring devices such as Garmin GPS devices and Leica Laser telemeters to start accurately mapping the site. The work gradually built-up into a useable data set. At the same time we also thought about designs and how new tools could contribute to the operation. The Chiliwung river is probably the less romantic side of Jakarta, we also call it the plastic river, It has about 6 ~ 8 meters layer of plastic sedimentation. Our study showed how the completely plastified riverbed, resulting from roughly 500 tons of rubbish being thrown into the rivers of Jakarta each day was a serious cause of flooding. Here we show a point cloud model of the Kampung Melayu site in Jakarta where the river's sixty-meter wide corridor (Fig. 16) curves through the city. We are actually proposing to cure the river and bring it back to heart of the matter in the city. We actually pushed the point cloud simulation far enough with the hydraulic engineers and with the landscape architects on the ETH research team to simulate the floods, but also contaminant transfers. This just shows how the whole point cloud technique has led to technological revolution. Not only can you embed 3D information into GIS references on point cloud base, but you can now also embed design variants and test them.

I think that the return of the aviators with geo-positioned point clouds heralds a real conceptual revolution in landscape architecture! My dream is for the aviator culture to flourish and spread it to various cooperative groups all over the world. This technology will undeniably improve our way to combat and design with the environmental problems we are facing.

15. 圣哥达山口的点云集模型
16. 甘榜马来由地区的吉利翁河点云模型
15. Point cloud overview of the Gotthard Pass
16. Detail of the Ciliwung point cloud model at Kampung Melayu



地理设计探索与实践
The Theory and Practice of Geodesign

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地理设计并不是一个全新的理念。例如中国古代提出的“高勿近阜而水用足，低勿近水而沟防省”就是地理设计思想在城市选址方面的成功运用。

Geodesign is not entirely a new concept. For example, the ancient Chinese did not locate cities close to highlands, in fear they would not be able to supply adequate water to residents. Similarly, cities should not be too close to low marsh lands, in order to build less drainage and flood management infrastructures.

水文评价在水资源管理中的应用
Integrating Hydrological Assessment for Water Resources Management

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对于水资源管理在多影响分析、快速迭代、合作平台方面的需求，地理设计能在理念上、流程上和技术上均予以支持。

Water resources management demands multiple impact analysis, quick iteration, and cooperative platforms, these could be supported by geodesign, in concept, in flow framework, and in technology.

地理设计的视觉反馈
Visual Feedback in Geodesign

马劲武
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Product Engineer at 3D Team of Esri

金字塔的最底层是数据，往上依次是信息、知识、智慧。我们思维的宽窄度取决于数据，但最终能否做出合理分析则要依靠我们的智慧。

At the bottom of the pyramid is data, upper levels are information and knowledge, with wisdom at the top. The territory of our thinking depends on the data, but wisdom is what we need to do reliable analysis.

清华大学地理设计系统发展与应用
The Development and Application of Geographic Design System of Tsinghua University

周文生
Wensheng ZHOU
清华大学建筑学院副教授
Associate Professor of School of Architecture, Tsinghua University

地理设计的理论、方法以及相应工具的发展需要来自城市规划、GIS，以及地理科学等各个领域人士的共同努力。

The development of geodesign theories, methods and tools depends on joint efforts from urban planning, GIS, and geographic science.

空间分析支持下的历史解释和遗产保护规划
Spatial Analysis for Historical Interpretation and Heritage Conservation Planning

何捷
Jie HE
天津大学建筑学院副教授
Associate Professor of School of Architecture, Tianjin University

通过对历史遗址的分析，我们能够更好地了解古人如何进行军事工程的空间布局。他们所做的是将军事的防卫工事和周边的自然环境结合在一起。

Through the analysis of historical sites, we have studied the layout of ancient military projects. The ancients engineered defense systems through integration with the environment.

流的重组：搭建场地和系统间的桥梁
Reassembling Flows: Bridging Sites and Systems

基斯 · 洛曼
Kees LOKMAN
美国圣路易斯华盛顿大学建筑学院助理教授
Assistant Professor of College of Architecture, Washington University in St. Louis

当我们做大规模的土地利用规划时，所考虑的主要因素是基础设施，可以说基础设施是社会的骨干、基石。由于基础设施的不断扩张，使得城市从集约发展转变为分散发展。与此同时，大型的灾害对城市带来的影响也将是巨大的。

Infrastructure is the main factor when we make the large-scale land use planning. Infrastructure is the foundation of our society. The increasing expanding of infrastructure has led intensive urban development shift to a more decentralized way. Consequently, the impact of major disasters to the cities will be imponderable.

管理“通往中国之路”：秘鲁亚马逊流域的设计、领域和数据
Governing the Road to China: Design, Territory and Data in the Peruvian Amazon

阿什利 · 斯科特 · 凯利
Ashley Scott KELLY
香港大学建筑学院助理教授
Assistant Professor of Architecture, the University of Hong Kong

跨区域、跨国家、跨大陆的跨界行为普遍存在，所以我们必须将视野放得更远。

Design that crosses region, countries, and continents are becoming more common; we should put more attention to off-site.

场地评估：建筑立面和城市音景中声学设计的关键
Implementation of Field-assessment: a Key Element in an Acoustic Design Guide for Building Facades and Urban Soundscape

爱琳 · 巴坦贝卡
Aireen BATUNGBAKAL
美国南加州大学建筑学院博士候选人
Ph.D Candidate at School of Architecture, University of Southern California

在音景设计领域，ArcGIS能够很容易实现可视化，以及在时间维度上的分析。通过ArcGIS，我们既可以追溯过去，也能够展望未来。

In the field of Soundscape, visualization and analysis in the time dimension can be easily achieved by ArcGIS, through which we could trace back to the past and prospect the future.

地理设计在宏观尺度土地利用规划实践中的应用——以北京市为例
The Practice of Geodesign in Macro-scale Land Use Planning: a Case Study in Beijing

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科学是高高在上的阳春白雪，但是公众无法理解它们。我们还有大量的工作要去完成，不仅仅在于发展地理设计，而是能让所有公民呼吸到新鲜的空气，喝到干净的水。

The science are highbrow, yet cannot be understood by general public. There is a lot of constructions to do, not only for geodesign, but for all the citizens to breath fresh air and drink clean water.

城市边缘区设计优先原则：生态农业网络和集聚城市发展
Prioritizing Peri-urban Design Principals: Eco-agro Networks and Clustered Urban Developments

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结合地图和信息追踪的可视化表现工具，对于土地利用决策的制定和设计进程而言非常关键。

Representational tools visualized through a combination of both mapping and tracing information is essential for informing land-use decision-making and the design processes.

何谓地理设计中的设计？——地理设计过程与其他设计理论的比较
Where is the Design in Geodesign? — How the Geodesign Process Compares with other Design Theories

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地理设计的不同之处在于其决策制定方面。其设计思考容纳了一系列的选择，以及对这些选择的评估，并将社区价值包含在内。

Geodesign is different than classic decision-making. It integrates design thinking to provide a range of choices and critical evaluation of options, and involves community values.

规划实践中地理设计应用的几点思考
Reflections on the Application of Geodesign in Planning Practice

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Associate Principal Urban Planner of Atkins (Beijing)

如何在中国目前的大背景下实现生态低碳的规划目标，我们提出了几个步骤：首先是生态诊断；其次是建立生态规划设计的指标体系；第三是编制生态规划方案与导则；第四是措施的实施；第五是生态控制。在整个过程中，地理设计都发挥着非常重要的作用。

In order to achieve ecological and low-carbon planning objectives under China's current background, we propose the following steps: ecological diagnosis, followed by an index system of ecological planning and design, formulation of ecological planning schemes and guidelines, implementation of measures, and finally ecological control. During this process, geodesign has played an important role.

丹麦哥本哈根密集城市之中的气候适应型设计
Climate Adaptation in a Dense City: Copenhagen, Denmark

孙峥
Zheng SUN
戴水道景观设计咨询（北京）有限公司中国区总监
Director and Architect of Atelier Dreiseitl (Beijing)

GIS的作用主要是支撑我们完成分析，即将我们的经验和其他软件进行配合，完成水资源平衡设计。

The main role of GIS in our work is to support our analysis; to combine our experiences with other software in order to complete the balanced hydrologic design.

控制性详细规划中的地理设计实践
Geodesign Practice in Regulatory Detailed Planning

牛强
Qiang NIU
武汉大学城市设计学院城市规划系副系主任、副教授
Deputy Chair and Associate Professor of Department of Urban Planning, School of Urban Design at Wuhan University

地理设计这个概念为我们提供了一个很好的契机，使得量化分析终于有了一个专业的表达术语。我认为地理设计使得城市规划的成果在科学性、可实施性和适应性等方面都得到了实质性的大幅度提高。

Geodesign provides a good opportunity for us to make quantitative analysis has a professional term. I believe geodesign significantly improve results of urban planning in terms of science, implementation and adaptability.

环境讯息指标与决策流程
Environmental Metrics and Decision Making Processes

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Registered Landscape Architect, LEED AP, Associate of SWA Group

即使是在同一环境资讯系统支持的框架下，不同的设计思路，仍然会产生截然不同的设计结果。我认为GIS工具的运用终究是改变人们设计思路的一个方法。设计就是对讯息进行整理并决定哪些讯息是重要的，经过演绎之后呈现一个透明而清晰的思绪流程。

Under similar frameworks of environmental information system support, different design ideas produce entirely different design results. I think the application of GIS is eventually a point where it can become a method to change people's design concepts. GIS based design can be used to collate information and decide which messages are important, while presenting a clear process for interpretation.

GIS在生态基础设施规划中的应用
GIS Applications in Infrastructure Ecological Planning

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GIS能够在宏观尺度上，构建国土生态安全格局，指导城市规划与建设；在中观尺度上，构建多功能的河流廊道和雨水生态管理系统；在微观尺度上，进行水敏感性场地的生态设计和生态水处理技术应用，把钢筋混凝土包裹的河道变成会呼吸的河道。

With the help of GIS at the macro scale, we can build ecological security patterns that will guide urban planning and construction. At smaller scales, such as the city scale, we can use GIS to design multi-functional river corridors and stormwater management systems. At the most detailed level, GIS will help complete ecological design of water sensitivity fields and turn the river wrapped with reinforced concrete into a more ecological, breathing river.

从传统规划与景观设计角度看地理设计的应用
Planning, Landscape Architecture and Geodesign

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与传统设计相比，地理设计更加注重分析，具有更强的逻辑性，能够提供更多定量的指导和选择。我希望地理设计能给设计带来更准确的参考条件、更有效的影响和更合理的选择。

Compared with traditional design methods, geodesign pays more attention to analysis and logic, and will provide more quantitative selections and guides. I hope geodesign will continue to be used to achieve more accurate landscape conditions, more effective influences and more reasonable solutions.

鱼池城市中的水处理
The Water Treat Process of Fish Pond City

鲁旸
Yang LU
北京易德地景景观设计有限公司设计总监
Design Director of Open Fields

在人口密集的城市中，水的利用是一个大问题。我们从这个问题出发进行项目的初始设计，并探索如何将生活污水转换成中水实现再利用，为我们的生活环境服务。

In densely populated cities, the use of water has become a serious problem. We regard this issue as a starting point of each project, and explore how to convert sewage into recycled water to achieve reuse, so as to serve for our living environment.

景观智能
Landscape Intelligence

路彬
Alex CAMPRUBI
狄艾恩（北京）建筑规划设计咨询有限公司设计总监
Design Principal at GC Design Center

智能景观将有助于更多的可持续发展的最佳实践；有助于建立邻里尺度的环境数据库；有助于重新配置我们的设计方式。

Intelligent landscape will be helpful for improving best practices of sustainable development, for the establishment of neighborhood-scale environmental databases, and for the relocation of our design method.

景观设计师的综合协调工作
Comprehensive Coordination of Landscape Architects

诸谦
Qian ZHU
上海广亩景观设计公司董事长、首席设计师
President and Chief Designer of Shanghai GM Landscape Design Co., Ltd.

容山纳水，创造唯一
Melting in the Landscape

马晓暐
Xiaowei MA
意格国际总裁、首席设计师
President and Chief Designer of AGER GROUP

我认为地理设计为我们提供了非常好的设计出发点和设计依据。但应切记，我们还是应该通过设计师细致入微的现场参与和观察，去重塑人与自然之间的浪漫关系。

Geodesign provides us with a good starting point and design basis for design. However, we should recreate the romantic relationship between man and nature through careful onsite participation and observation.

生态景观实践中的多专业合作
Multi-disciplinary Collaboration in Sustainable Landscape Design Practice

盛梅
Mei SHENG
美国ATA设计公司（劳伦斯集团）设计总监
Principal of ATA LAWRENCE GROUP

没有技术就不可能产生任何思维的进步或者推进，但不论我们采用什么手段，都要把握住让场地回归自然，使它呈现出应有的原貌这一原则。

Advancements in thinking will not be generated without new technology. However, no matter what means we use to develop new technology, we should try to bring the field back to nature and its original appearance.

好的决策比好的设计重要，好的决策人比好的设计师重要，这正是进行综合协调的意义所在。优秀的综合协调能够获得最多的资源、最大的合力，设计师再教育的必要性也在于此。**LAF**

In many cases, a good decision-making is more important than a good design; a good decision maker can be more important than a good designer. This is the significance of comprehensive coordination. Excellent comprehensive coordination will lead to the most design resources. This is also the necessity of designer re-education. **LAF**