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Elevators: Continuity and Enrichment of Architectural Experience

电梯：建筑游览经历的延续和丰富

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Abstract

Until recently, elevator cabins used to be more like closed transportation boxes than an element of architectural experience. From a passenger's perspective, the limited stimulation experienced in a typical elevator can be an awkward interruption to the complex, enriching experience offered by the architecture of tall buildings. A new technology that enables a ride in an elevator to become a natural part of a building's architectural experience, revealing the building's spatial relationship to the surrounding streets, parks and buildings, is described in this paper. The technology is Lift Eye™, the world's first and most realistic virtual elevator window system designed to transform the passenger's experience with real-time streaming of photo-realistic panoramic views, shown on High Def widescreen displays in the elevator. With LiftEye, any elevator can now provide an experience that is more connected, more interesting, more engaging than even a costly glass-walled panoramic elevator, but at a fraction of the cost.

Keywords: Vertical Transport, Communication, Connectivity, Realtime, Augmented Reality

摘要

到不久以前，电梯仓一直被认为是一种接近于封闭的箱仓运输的经历而不是一种建筑游览体验。从乘客的角度而言，高层建筑提供的包罗万象的视野感觉，会被一个典型电梯提供的有限的视野刺激所破坏。 本文将描述一种新型的技术，能够使电梯中的旅行经历成为大厦建筑游览体检的一个自然的部分，这种技术能够展示建筑物同周围街道、公园和建筑物之间的空间关系。 这种技术称为Lift Eye™——抬起你的眼睛，是世界上第一个也是最真实的虚拟电梯橱窗系统。这个系统的设计是通过实时传输电梯周围的全景实照以转换乘客的旅行经历，在电梯里设置的高清晰度宽屏里显示电梯周围的景观。 通过LiftEye (抬起你的眼睛) 技术，任何电梯都可以提供比一面昂贵的透明玻璃外墙而具有更能连接现实更有趣更吸引人的旅行经历，其成本却只是玻璃外墙的一小部分。

关键词: 垂直运输，传输，联接沟通，实时，扩增实境

Lift. Eye?

For people working and living in high-rise buildings having to move between floors is inevitable. In most cases elevators in such buildings are closed steel boxes that aren't very aesthetically remarkable. In all those boxes people are disconnected from the environment, and thus have no chance to enjoy breathtaking views.

In most cases, the only way to inform passengers of their location is a floor indicator, supplemented only by the passengers' sense of movement and acceleration. Such sensual deprivation leads to extra focus on the unpleasant side of elevator trips: bumps, foreign sounds, sharp accelerations, odors. Disconnecting a passenger from their customary environment leads to less-than-stellar journey experience, which is brilliantly performed in Wes Anderson's recent movie episode (see Figure 1).

Arriving to work, apartment or hotel room people need some time to adjust their

电梯。眼睛?

对于生活和工作在高楼大厦中的人来说，在楼层之间移动是不可避免的。通常这种大厦的电梯都是密封的钢质仓，不怎么具有突出的美学效果。而在电梯仓中人们同周围环境隔离开来，因此根本没有机会享受美景。

Figure 1. Sensual deprivation of elevator passengers as performed in episode of 'The Grand Budapest Hotel' by Wes Anderson. Source: Fox Searchlight
图1. 在韦斯安德森最近的电影作品《布达佩斯特大饭店》片段中体现的电梯乘客的感官剥离。来源: 福克斯探照灯电影公司

mind, provided they have time for that. A vertical journey inside a tall building should be a perfect moment to recharge mentally, but rarely is. The conventional elevator ride is a disconnect moment that contrasts sharply with the connectedness that tall buildings enable one to feel towards the enveloping city and one's relationship to it and the world beyond. This disconnect alone is a sound reason to choose panoramic elevators over conventional ones. Unfortunately, oftentimes panoramic elevators turn out to be infeasible due to costs and engineering issues. Is there a solution?

With LiftEye, any elevator can now provide an experience that is more connected, more interesting, and more engaging than even a costly glass-walled panoramic elevator, but at a fraction of the cost.

Lift. Eye.

The apparent simplicity of the idea has already led to certain implementations that synchronize pre-filmed videos the vertical movement of elevators: Montparnasse 56 in Paris and Petronas Tower. Sometimes it's a digitized cartoon, which follows the vertical movement to reestablish contextual awareness like it's shown in a movie 'Her' by Spike Jonze (see Figure 2). LiftEye however is far more sophisticated.

LiftEye.

LiftEye as a device for displaying the situation outside a building with an elevator restores the gap in context and offers a communication tool between citizens, buildings, and the city. This tool can serve for long-distance communications as well. LiftEye is a fresh, groundbreaking solution, as well as a sound implementation of IT in the elevator industry.

Figure 2. Digitized cartoon, which follows the vertical movement in episode of 'Her' by Spike Jonze. Source: Annapurna Pictures / Warner Bros
图2. 数字卡通，电影《她》(又译:《云端情人》)中史派克琼斯所做的伴随着电梯的垂直运动。来源: Annapurna 影业公司 / 华纳兄弟影业公司

通常情况下，唯一用来通知乘客他们所在地点的方式，就是通过楼层识别装置，伴随着乘客自己感受到的电梯移动和加速。这种感官上的剥离，导致乘客乘坐电梯时更加注意到让人不太愉快的一面: 碰撞，外来的声音，突然加速，不好闻的气味等等。把乘客同他们习惯的环境隔离开所带来的不怎么愉快的旅行经历，在韦斯安德森最近的电影作品片段中得到精彩的体现。(见图1)

到达工作地点、公寓或者旅馆房间的时候，人们需要一段时间来调整情绪，如果他们有时间做这样的调整的话。一段高层建筑里的垂直旅行，可以是给大脑充电的完美时刻，但是现实中根本不是这样。传统的电梯之旅是一个切断联接的时刻，而与之鲜明对比的是，高层建筑本身所代表的联接性，就是为了要人们感受到视野包围的城市以及人类同城市和外面世界的联系。不幸的是，由于成本和工程操作问题，全景电梯总是不太现实可行。有什么解决方式吗?

通过LiftEye (抬起你的眼睛) 技术，任何电梯都可以提供比一面昂贵的透明玻璃外墙而具有更能联接现实更有趣更吸引人的旅行经历，其成本却只是玻璃外墙的一小部分。

电梯。抬起你的眼睛

这个想法非常简单，以至于某种程度上可以通过事先拍摄的视频与电梯的垂直运动同步这种方式得到实现，比如巴黎蒙帕纳斯大楼56层观景台 (Montparnasse 56) 和马来西亚佩尔纳斯大厦双峰塔 (Petronas Tower) 。有时候屏幕上显示的是数字卡通，伴随着电梯的垂直运动重建乘客感官上的知觉，就像电影《她》(又译:《云端情人》)中史派克琼斯所做的 (见图 2) 。然而LiftEye (抬起你的眼睛) 技术却更复杂。

LiftEye技术

LiftEye设备可以显示电梯所在的大厦建筑以外的景观，这恢复了感官隔离的差距感，并成为人、建筑物和城市之间的沟通工具。这个技术也可以用于远程传输。LiftEye技术是一种开辟创新的解决方式，也实现了信息技术同电梯工业的有机结合。

LiftEye 技术包含着原创的结构和特别设计的摄像机，技术正在专利申请中。图3所示的技术系统 (Gorilovskij and Gorilovskij, 2008) 包括少量永久固定在建筑物外墙上的摄影机以及置于电梯里的计算机设备和高清晰度显示屏幕墙。

固定在建筑物外墙上的少量摄影机，是用来拍摄全景景观的。在摄影机拍摄到的视频基础上，通过复杂的软件加工生成如同照片一样真实效果的虚拟立体图像，这些图像能够准确的反应景物的光影变化和城市里晴雨、昼夜的交替变更。

事实上，最终生成图像里的每个像素都是经由LiftEye软件准确计算。这种革新技术能够成为未来发展的强有力的核心，并实现了各种扩增实境技术的特点。

电梯里显示屏显示的影像是同电梯所在的实际高度相对应的，电梯的高度是通过高度传感器测量获得。随着电梯的升降，可以随时改变各种视角，这会给予乘客一种实时实地全面观察的感官体验。

电梯里的显示墙还可以切换成在其他地点安装的LiftEye设备传输来的景观图像，反之，现在显示的LiftEye 视频图像也可以传输到其他地点。

LiftEye 技术的主要特点有:

The LiftEye solution consists of an original, patent-pending structure and specifically designed cameras. The system (Gorilovskij and Gorilovskij, 2008) as shown on Figure 3 includes a small number of cameras permanently fixed on outer walls, computing devices, and a high definition video monitor wall in the elevator car.

The panoramic views are captured by the small number of fixed cameras installed outside the building and sophisticated software then generates a photo-realistic virtual 3D images based on the video from these cameras, accurately capturing changing light and shade, sunshine or rain, day or moonlight, across the city.

Literally every pixel of the resulting image is computed by the LiftEye software with great accuracy. This innovative technology can become a powerful core for further development and implementation of numerous augmented reality features.

The actual view displayed on the monitor corresponds with the actual altitude of the elevator car, as measured by an height sensor. Perspective is smoothly altered as the elevator ascends or descends, giving an entirely realistic sense of place and time for passengers.

The display wall may be switched to a view from another location equipped with LiftEye and vice-versa the present LiftEye video data may be transmitted to other locations.

The main benefits of LiftEye are:

- Ease of implementation in an elevator of any make, whether already installed or planned
- Absence of interference with elevator safety circuits
- Minimal impact on the façade, as only a few constantly fixed cameras are used. The installment and maintenance costs are therefore reduced
- The ability for designers and manufacturers to arrange cage interiors on their own
- Openness to further development by third parties with respect to augmented reality, advertising, newsfeeds etc.
- Enhanced privacy: video is never recorded and/or stored

The LiftEye system can help kick-start a new segment of the infotainment economy where user attention is the main currency, since user engagement with the views shown on the High Def widescreen displays will be high. The High Def displays can also show panoramic views as though the lift were in any other building in the world – so for example a hotel chain with a high-rise in Shanghai could have lifts with TV panels that show the real-time panoramic view not only from their Shanghai property, but also their hotels in say Chicago, New York and London.

A market demand for 2 types of LiftEye installation is already found. The first is LiftEye-Transmitter (see Figure 4), which is more expensive and exclusive than other LiftEye versions. A great view is obligatory for this implementation. The owner will get an ever-increasing global audience of subscribers to the views from their high-rise. This solution requires the complete version of LiftEye software and installation of a number of LiftEye cameras on the outer wall of the building.

The second type of installation, LiftEye-Subscriber (see Figure 5) represents a more affordable solution, since it doesn't have any cameras, receiving its data from elsewhere instead. It can be installed in any elevator, especially in locations where no great views are available

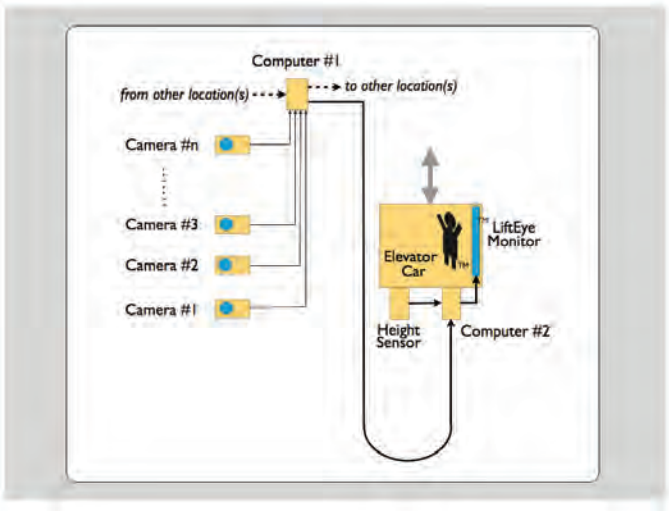

Figure 3. LiftEye General Scheme. Source: LiftEye
图3. LiftEye 系统总体规划图。 来源: LiftEye公司

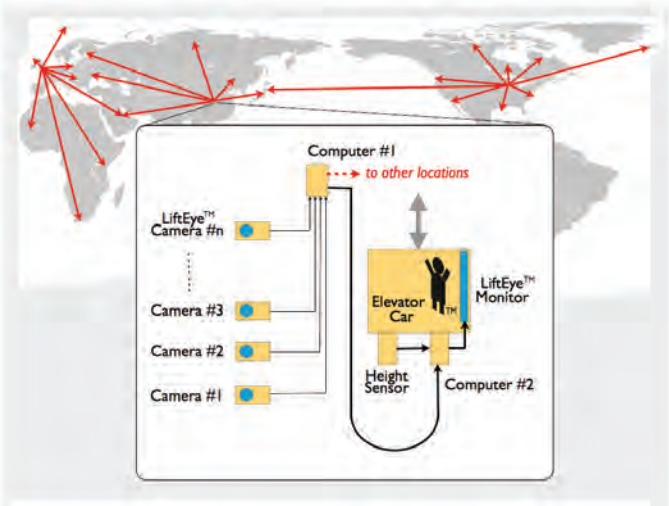

Fig 4. LiftEye-Transmitter Scheme. The owner will get an ever-increasing global audience. Source: LiftEye
图4. LiftEye系统- 传送器模式. 使用者可以吸引越来越多不断增长的各国用户。 来源: LiftEye公司

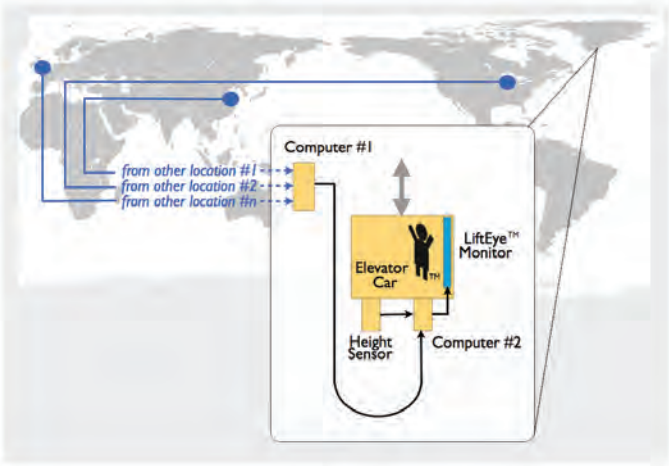

Fig 5. LiftEye-Subscriber Scheme. A passenger can select a view from a list of available locations. Source: LiftEye
图5. LiftEye系统- 用户模式. 乘客可以在备选目录中选择可能的地点浏览景观。 来源: LiftEye公司

at all. Subscriber version requires the basic version of LiftEye software only. A passenger can select a view from a list of available locations.

Additionally, there's a LiftEye-Kiosk version (see Figure 6), which is a particular case of the Subscriber version. Any person in the street may enjoy great views in real time from a selected skyscraper and interact with the system by controlling the speed and direction of vertical movement or simply request to see a view from a certain altitude of the featured tall building.

LiftEye-Kiosks are expected to be available at airport terminals closer to departure gates. Their main mission will be to entertain departing passengers by showing actual views from distant destinations around the globe. The Kiosks could also come handy at tourist information bureaus where they might provide dynamic real time views from famous city landmarks to attract visiting tourists to particular places of interest.

As already mentioned above, LiftEye displays are easy to install in elevators of any brand, both new and existing. But to be successful in the market, LifyEye installations must comply with respective weight limitations and not affect static and dynamic strength of the structures. It should also be able to monitor such things as the scratch protection of surfaces and levels of heat emissions, all while meeting the aesthetic criteria of the design.

Another, very important requirement is a data channel to deliver video stream to the elevator car without any picture artifacts. Our current solution involves an Ethernet cable in the trailing cable structure which is sufficient for cable length below 100 m. For higher trailing cable length incorporated optic fibre is required.

The currently available implementation can feed up to 3 HD displays arranged in a single vertical column simultaneously, thus enabling the overall resolution of 3240x1920 pixels. The total weight of 3 monitors depends on the screen size and may reach up to 3x32 kg for a video wall of 2610x1460 mm.

The weight and its distribution to one particular car wall should be submitted to the car manufacturer for the approval. To avoid further

Fig 6. LiftEye-Kiosk. An artist's render proposal. Source: LiftEye
图 6. LiftEye系统- 自助亭模式. 一位艺术家提出的意向。 来源: LiftEye公司

- 可以在各种型号的电梯内部简易安装，无论电梯是否之前已经安装或设计
- 不会同电梯的安全线路互相干扰
- 对建筑物正面很少影响，因为外墙上只会使用少量长期固定的摄影机，安装和保养成本因而降低。
- 可以保障电梯设计者和生产商自由安排电梯仓内部的设计
- 对扩增实境、广告和新闻等第三方服务提供更多发展空间
- 增加了对隐私的保护: 视频图像永远不会被录制或保存

LiftEye系统能够帮助开拓资讯娱乐经济的新领域。在资讯娱乐经济中，用户的注意力就是经济来源，而在本系统中用户对于高清晰度宽屏上显示的景象的注意力和投入度会非常高。高清晰度屏幕同样可以显示其他地方的全景景观，就好像电梯是安装在世界上任何其他地方的大厦建筑物里————例如一个上海的连锁饭店的大厦建筑的电梯里可以装有电视屏幕，实时显示不同地方的全景，不仅可以显示上海建筑物上摄到的上海地物，还可以显示他们在芝加哥、纽约和伦敦的连锁酒店外的当地景观。

目前市场需求反映了两种LiftEye系统安装模式。一种是LiftEye系统- 传送器模式 (见图4)，这种安装模式比其他方式更昂贵但更有专营性，可以保证观赏到非常美丽的景观。使用者可以吸引越来越多不断增长的各国用户来他们大厦观赏。这种模式需要安装全套的LiftEye软件系统，还需要在建筑物外墙安装一系列LiftEye摄像机。

另一种是LiftEye系统- 用户模式 (见图5)，这种安装模式比较经济实用。它不需要安装摄影机，而是从其他地方接收视频数据。这种模式适用于各种电梯，尤其是那些安装在无法提供美丽景观位置上的电梯。用户模式仅需要安装LiftEye基本软件系统，乘客可以在备选目录中选择可能的地点浏览景观。

此外，还有一种LiftEye系统-自助亭模式 (见图6)，这种模式是用户模式的一种特例。任何街道上的行人在自助亭里，都可以观看到所选大厦建筑上显示的实时景观，并且通过系统控制选择，观看电梯在不同速度和上下垂直运动中显示的景观，或者只是简单的选择观看某个建筑物在某个高度上显示的景观。

LiftEye系统-自助亭模式可以设在机场大厅，或者距离登机门比较近的地方，主要目的是可以通过显示目的地城市的实地景象来娱乐离境乘客。自助亭模式也方便在旅游景点设立，可以向游客提供城市重要景点的各种动态实时景观，用来吸引游客前往旅游胜地。

如上所述，LiftEye系统在各种新旧品牌的电梯中都可以简易安装，但是要成功使用，系统安装必须符合各类不同电梯的重量限制，并保证不影响其稳定性和动力承重结构; 并且该系统也能够显示器刮擦保养和散热基准等问题，同时达到设计上的美学标准。

另外非常重要的是，要求保证一条将视频信号毫无阻碍传输到电梯仓的数据传输渠道。我们目前的解决方式是使用拖曳式电缆结构中的网络线连接，这对少于100米长的网线是足够的。对于更高的拖拽长度，需要引入光纤传输。

目前可行的实现方式是能够保证同时传输安置在一面竖直墙壁上的三个高清晰度屏幕，而视频的清晰度可以总体达到3240X1920像素。三个屏幕的总重量取决于屏幕的大小，对于一面 (长宽) 2610x1460毫米的视频墙来说，屏幕最大可以达到的重量是3x32千克。

屏幕的重量以及屏幕在一面墙上的分布安装应该提交电梯生产商批准，要避免结构超重，推荐使用加硬玻璃加薄保护层的结构。

overweighting of the structure the use of a thin protective layer of hardened glass is recommended. The overall structure will be similar to that utilized in most modern smartphones. The car designer must also take care of sufficient heat dissipation. There are several known options to meet all of criteria mentioned.

LiftEye is a groundbreaking communication tool, which provides real-time view from any point on the wall of the equipped building. The view is absolutely authentic and detailed. Businesswise, LiftEye offers value on a number of levels. An owner of a building with great, exclusive views can attract an ever-increasing subscriber base that in turn helps to attract tenants and visitors. Businesses may also augment great views with commercial messages, earning additional return on their investment.

LiftEye: Augsburg Case.

In October 2013 LiftEye was first showcased (see Figure 7) and received incredibly positive feedback (Brownstone, 2014), (Busta 2014), (Chua 2014) at one of the world's most prestigious trade shows for elevators and escalators – Interlift, which took place in Augsburg, Germany. The trade fair was attended last year by nearly 19 thousands architects and industry experts from around the world (see Figure 8). LiftEye was recognized (Interlift 2013 Catalogue) as a one of a kind virtual window view elevator system that has established itself as a new product category in the elevator industry: namely Lifteye as an elevator equipment type appears between Landing door devices and Lifts without machine room in Products search index. One may even expect the word 'lifteye' gain a status similar to the word 'xerox', which over time became a synonym for the process of photocopying.

The LiftEye team proved its ability to install and commission a complete system in a very short timeframe in Augsburg. The actual timeline is shown on (see Figure 9). Both installation and commissioning took just 6 days before the trade fair opened. Needless to say, the job was thoroughly planned in advance.

Fig 7. Official LiftEye poster for Interlift. The view to the City of London is featured with rain drops clearly appeared on elevator car wall monitor. Source: LiftEye
图7. 在世界电梯展会Interlift 上的LiftEye官方海报。这个伦敦市景观的特点是能够通过电梯仓内的监视器清楚得看到雨滴。 来源: LiftEye公司

整体结构应该同现代智能手机的应用原理类似。电梯仓的设计者必须考虑到足够的散热功能。 可以有多种选择，能够使各方面都达到合格标准。

LiftEye 技术是一种创新的沟通工具，能够通过建筑物墙壁上的任何一点提供实时景观。景观绝对真实而且细致完备。从商业角度而言，LiftEye技术能够提供多重价值。使用该技术的建筑物所有者可以通过这样的景观吸引越来越多的该技术的用户，而此举反过来也会带来更多租客和游客光临。在建筑物内的商家也能在景观浏览中加入商业信息，为他们的投资获得额外利润。

LiftEye技术: 奥格斯堡 (Augsburg) 案例.

2013年10月 LiftEye技术第一次面世 (见图7) 并在德国奥格斯堡举行的世界上最著名的电梯贸易展会 (Interlift) 上受到非常肯定的赞誉 (Brownstone，2014，Busta，2014，Chua，2014) 。这个展会当时有来自世界各地的19000多名建筑和工业专家参与 (见图8) 。LiftEye技术被认为 (Interlift 2013目录) 是目前提供虚拟窗景的电梯系统之一，并被称为电梯工业的新产品; 也就是说 LiftEye 作为一种电梯装置，其产品检索索引隶属于层门设施和无机房电梯装置之间。有人甚至认为"Lifteye"可能获得像"Xerox" (施乐的品牌) 这个词被赋予的内涵和地位一样，随着时间的推移成为品牌所代表的功能 (复印和影印) 的同义词。

在奥格斯堡，LiftEye团队证明了其能够在短时间内安装和布置完整系统的能力。时间安排请参见图9。安装以及布置只需要在贸易展会前花6天完成。更不必说，所有工作都是提前规划并完成。

尽管在奥格斯堡Interlift贸易展上，展览台电梯的展示高度不到10米，但LiftEye技术的所有特征都经过详尽的执行，这样的安装起到了试验的效果: 立体景观的实现在较低的高度对于系统来说是最具有决定作用的 (见图10) 。

读者应该可以通过youtube浏览在Interlift贸易展的展台上拍摄的视频，请见参考文献。 (LiftEye，2014)

LiftEye技术: "曼哈顿 (Manhattan) "案例

曼哈顿是一个具有高密度高层建筑的示范地区。像曼哈顿中心这样的地区，人们总是看不到好的景观。大部分的高层建筑根本没有机会安置全景电梯。无数游客和宾馆住客在楼层上下之间同纽约的物理环境和建筑地缘完全隔离。

在这种情况下，可以看到模拟实时景观的电梯内部显示器就成了

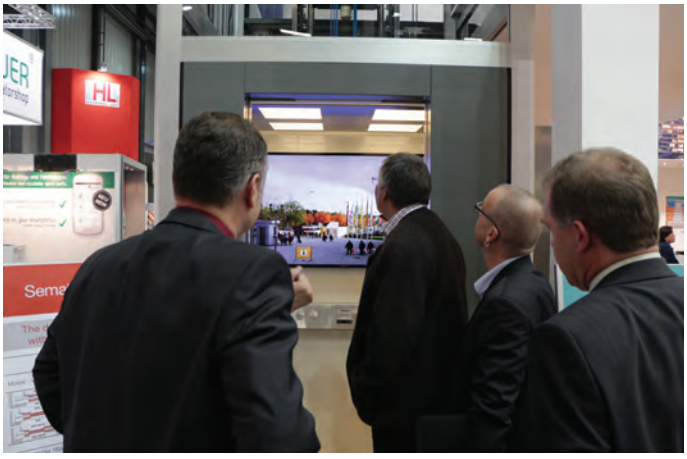

Fig 8. Interlift 2013 visitors at LiftEye boost. Source: LiftEye
图8. 2013年世界电梯展会Interlift上对lifteye 感兴趣的众多参观者络绎不绝 来源: LiftEye公司

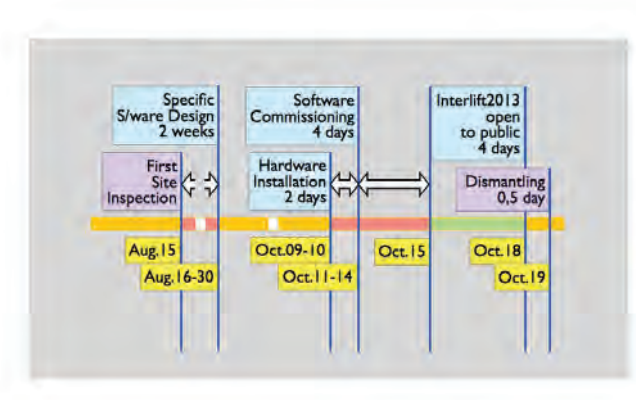

Fig 9. LiftEye Time Line at Interlift 2013. Source: LiftEye
图9. 在2013Interlift 贸易展会上LiftEye的安装时间表。 来源: LiftEye公司

Although the travel height of elevator in the booth at the Augsburg Interlift Trade show was less then 10 meters, all of the main LiftEye features were carefully performed and the installation played a role of a Test Card: the performance of 3D picture at low heights is the most critical for the system (see Figure 10).

Readers should be addressed to the movie filmed at the LiftEye booth at Interlift in YouTube. (LiftEye, 2014)

LiftEye: 'Manhattan' Case

Manhattan here is used as an example area with an extremely high density of tall buildings. For places, like Midtown Manhattan, there is always a shortage of good views. There are no chances to arrange panoramic elevators in most of the buildings there. Numerous visitors and hotel guests are completely disconnected from the physical and architectural context of New York City while they are riding up and down.

In this case, virtual real-time view monitors built into elevator cabs became a tool to reestablish broken contexts (see Figure 11). The tenants may get additional information about current traffic, weather, points of interest layered over the view. A proposed possible distribution scheme of LiftEye data from one Transmitter source of great view to several Subscribers is shown on Figure 12.

Augmented reality capabilities provide a smart way of advertising and the delivery of context information to elevator passengers. LiftEye is a perfect platform for all those features.

On a more general note, one should always remember that unlike tourists or passers by, residents care about the view much more than they do about the exterior of the building. Having to spend significant amounts of time in a tall building means a certain detachment from the life outside, and any additional way to remain in touch with the outer world goes a long way towards better mental shape. LiftEye is meant to keep people in touch with the outer world, and through this, quite possibly, with their inner selves.

Fig 10. LiftEye camera fixed on glazed façade of Interlift Hall in Augsburg. Source: LiftEye
图10. 固定安装在光滑的奥格斯堡Interlift 贸易展大厅正面的LiftEye 摄影机 来源: LiftEye公司

Fig 11. The artist render of elevator with LiftEye monitors inside. Source: LiftEye
图11. 艺术家提出的电梯使用意向，电梯内装有LiftEye的显示器。 来源: LiftEye公司

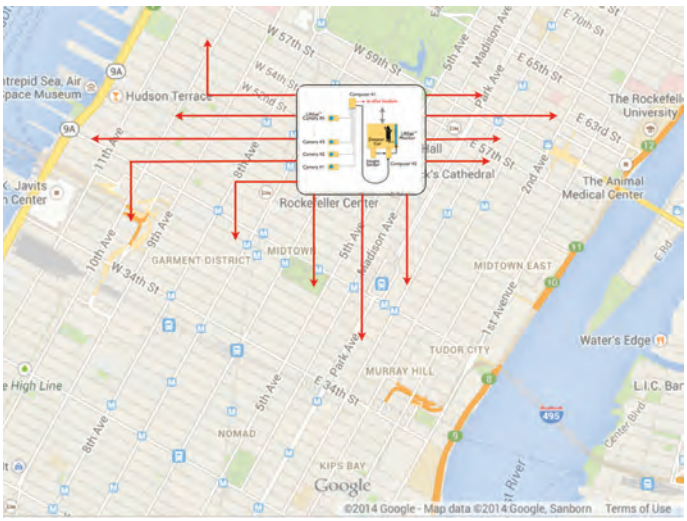

Fig 12. Distributing scheme of the same good view to several hotels in Manhattan, NY. Proposal. Map source: Google
图 12. 纽约设想: 将同一个曼哈顿景观分发传送给不同宾馆的方式 地图来源: Google 网站

Conclusions

- Lifteye is a brand new tool for enriching the tall building architectural experience, using the elevator
- Commercially available in 2 formats: transmitter and subscriber
- Fast and inexpensive to install; no complex integration with existing elevator systems
- Establishes a new product category in the elevator industry
- The real time views shared with elevator passengers in any building connected to the lifteye-network is a smart new way of driving user engagement and enriching user experience
- Great views from tall buildings are a valuable resource and can be a key part of a holistic, harmonious urban experience
- Lifteye is a novel way to improve a building's contribution to the city
- Views across a city from the tall building are welcomed from the very beginning, even by those who dislike the external appearance of the skyscraper
- Communication with residents of the city, with other buildings and city to city through lifteye real-time views is both compelling and engaging.
- Lifteye enables this communication and provides continuity and enrichment of architectural context for everybody who enters the tall building and rides the elevator.

重建那些破裂联系的工具 (见图11) 。大厦的租客可以通过显示的景观获得实时的交通、天气和景点的附加信息。另外，从LiftEye系统的一个传送器将景观的数据源传送给其他高层大厦的用户使用，这种方式也会成为可能 (见图12) 。

这种扩增实境技术为面向电梯乘客推动广告和信息传递提供了一种便捷的方式。而 LiftEye技术恰恰是实现了多种功能的完美平台。

总体而言，人们应该知道比起游客和过客，住客本身更加注重高楼大厦的外观。住在大厦里相当长的时间，意味着住客同外界生活总有某种程度的脱离，而任何能够保持住客同外面世界联系的方式都对人的思维和心情大有裨益。LiftEye技术特地为这点而设，保持人同外面世界的联系，并且通过这个，也更可能增进人同内部自身的联系。

结论

- LiftEye是一种全新的通过使用电梯而丰富高层建筑生活体验的工具
- 商业上可以通过两种模式应用: 传送器模式和用户模式
- 安装快速，成本低廉; 对于已安装的电梯系统，不需要复杂的整合装置
- 在电梯工业开辟了一个新的产品类别
- 在LiftEye系统联网的任何建筑物的电梯中的乘客都可以分享实时景观，这是一种吸引和丰富游客使用体验的创新方式。
- 从高层建筑上拍摄的景观是很有价值的资源，可以作为整体、和谐的城市体验的重要组成部分。
- LiftEye作为一种新颖的实现方式，可以增加高层建筑物对城市的价值体现。
- 跨城市的高层建筑物的景观欣赏，从这种技术一开始使用就很受欢迎，即使那些不喜欢摩天大厦外观的人，也仍旧推崇这种方式
- LiftEye 实时景观成为连接城市住户，连接其他建筑物，连接城市与城市之间的媒介， 这是一种不可抗拒、十分吸引人的体验。
- LiftEye使这种沟通成为可能，为每个步入高层建筑乘坐电梯的人提供了建筑游览体验的延伸和丰富

References (参考书目):

Geraldine Chua (2014) **World's First Realistic Virtual Elevator Window System Transforms Lift Experience**, Architecture & Design, Available from: http://www.architectureanddesign.com.au/news/world-s-first-realistic-virtual-elevator-window-sy

Gorilovskij A and Gorilovskij D. (2008). **Device for Displaying the Situation Outside a Building with a Lift**, Pub.No.:US2011/0199488A1

Hallie Busta (2014) **Feeling Trapped? This Panel Gives Elevator Passengers a View Outside**, Architect, Available from: http://www.architectmagazine.com/technology/feeling-trapped-this-panel-gives-elevator-passengers-a-view-outside_o.aspx

LiftEye – Virtual Window for Elevator. (2014). Available at: http://www.youtube.com/watch?v=mTtHGsH6AVw

Meet The World: interlift 2013 Catalogue, AFAG Messen und Ausstellungen GmbH, Augsburg, Messezentrum – Warensuchwörterverzeichnis (Products Search Index): 1113 LiftEye, pp.156, 160, 211

Sydney Brownstone (2014). **This Elevator Might Make You Forget You're Stuck in a Metal Death Trap With Strangers**, Fast Company / Co.Exist, Available from: http://www.fastcoexist.com/3028539/this-elevator-might-make-you-forget-youre-stuck-in-a-metal-death-trap-with-strangers