

Legal and Regulatory Challenges of Satellite Internet Services and Opportunities for Commercial Space Enterprises

**卫星互联网服务在法律监管方面的挑战以
及为商业航天企业带来的机遇**

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1. Introduction to USPACE

- An international commercial space company with satellite manufacturing as its core business (HKEX Stock Sticker Symbol: 01725.HK)

- ✓ Headquarters: Hong Kong
- ✓ Business: satellite manufacturing, TT&C, data processing
- ✓ Facilities: AIT, TT&C, Data center
- ✓ Categories: Remote sensing, telecommunication
- ✓ Concept: Industrialized design, mass production, low-cost

1. 洲际航天科技集团简介

- 一家以卫星制造为核心业务的国际商业航天企业(香港联交所股票代码: 01725.HK)

- ✓ 总部: 香港
- ✓ 业务: 卫星制造、测运控、数据应用
- ✓ 设施: AIT中心, 测运控中心, 数据处理中心
- ✓ 卫星: 遥感、通信
- ✓ 理念: 工业化设计, 批量化制造, 低成本



2. Core advantages of satellite internet services 2. 卫星互联网服务的核心优势

- ❑ Satellite internet is a technology that provides broadband internet connections worldwide via orbiting satellites.
 - ❑ Core advantages:
 - ✓ **Global coverage:** Overcomes the limitations of traditional network infrastructure to provide a seamless network.
 - ✓ **Cost-effective:** For remote areas, satellite internet is more cost-effective than laying optical fibres.
 - ✓ **Emergency communications:** In the event of a collapse of terrestrial networks (e.g. natural disasters, wars), satellite internet can provide critical communications.
 - ✓ **Technological innovation:** Promotes the development of cutting-edge technologies such as AI, big data, and the Internet of Things (IoT).
 - ✓ **Digital equity:** Helps developing countries and poor areas achieve internet penetration and improve economic and educational opportunities.
- ❑ 卫星互联网是一种通过轨道卫星向全球提供宽带互联网连接的技术。
 - ❑ 核心优势：
 - ✓ **全球覆盖：**克服传统网络基础设施限制，提供无死角网络。
 - ✓ **经济高效：**对于偏远地区，卫星互联网比光纤铺设更经济。
 - ✓ **应急通信：**在地面网络瘫痪时（如自然灾害、战争），卫星互联网可提供关键通信保障。
 - ✓ **技术创新：**推动AI、大数据、物联网（IoT）等前沿科技发展。
 - ✓ **数字公平：**帮助发展中国家和贫困地区实现互联网普及，提高经济与教育机会。

3. Major challenges facing satellite Internet services

- ❑ Spectrum resources and orbit management
- ❑ National security and data sovereignty
- ❑ Data privacy and network security
- ❑ Market access and commercial operation permits
- ❑ Space law and environmental responsibility
- ❑ Government intervention and policy uncertainty

3. 卫星互联网服务面临的主要挑战

- ❑ 频谱资源与轨道管理
- ❑ 国家安全与数据主权
- ❑ 数据隐私与网络安全
- ❑ 市场准入与商业运营许可
- ❑ 太空法与环境责任
- ❑ 政府干预与政策不确定性

Challenge 1: Spectrum resource and orbit management

挑战1：频谱资源与轨道管理

□ Regulatory challenges:

- ✓ Competition for spectrum: Satellite internet needs to share spectrum with terrestrial communications, broadcasting and military communications.
- ✓ Tight orbital resources: Large-scale deployment of LEO satellites may lead to collision risks.

□ Countermeasures:

- ✓ Comply with ITU regulations and allocate spectrum reasonably.
- ✓ Improve utilisation by adopting intelligent spectrum sharing technology.
- ✓ Reduce space debris by adopting recoverable satellite technology.

□ Opportunities for space companies (USPACE):

- ✓ Develop efficient spectrum management systems to optimise resource mobilization.
- ✓ Provide low-cost, recoverable satellite technology.

□ 监管挑战:

- ✓ 无线频谱竞争：卫星互联网需与地面通信、广播、军用通信共享频谱。
- ✓ 轨道资源紧张：LEO卫星大规模部署可能导致碰撞风险。

□ 应对措施:

- ✓ 遵守ITU规定，合理分配频谱。
- ✓ 采用智能频谱共享技术，提高利用率。
- ✓ 采用可回收卫星技术，减少太空碎片。

□ USPACE机遇:

- ✓ 研发高效频谱管理系统，优化资源使用。
- ✓ 提供低成本、可回收的卫星技术。

Challenge 2: National security and data sovereignty

国家安全与数据主权

□ Regulatory challenges:

- ✓ **Data sovereignty disputes:** Some countries require data to be stored locally, and satellite internet may bypass traditional networks.
- ✓ **National security scrutiny:** Some countries are concerned that foreign satellites may affect the security of their communications.

□ Countermeasures:

- ✓ Set up local data centres to meet data sovereignty requirements.
- ✓ Provide a secure regulatory interface to reduce national security risks.
- ✓ Use end-to-end encryption to protect data security.

□ USPACE opportunities:

- ✓ Provide customised localised data storage solutions.
- ✓ Develop secure encrypted communication satellites that meet the regulatory requirements of various countries.

□ 监管挑战:

- ✓ **数据主权争议:** 部分国家要求数据存储在本地，卫星互联网可能绕开传统网络。
- ✓ **国家安全审查:** 部分国家担忧外国卫星影响本国通信安全。

□ 应对措施:

- ✓ 设立本地数据中心，符合数据主权要求。
- ✓ 提供安全监管接口，降低国家安全风险。
- ✓ 采用端到端加密，保障数据安全。

□ USPACE机遇:

- ✓ 提供定制化的本地化数据存储解决方案。
- ✓ 研发安全加密通信卫星，符合各国监管要求。

Challenge 3: Data privacy and network security

数据隐私与网络安全

□ Regulatory challenges:

- ✓ Transnational data flow: Potential violation of data privacy regulations such as the General Data Protection Regulation (GDPR).
- ✓ Risk of hacker attacks: Satellite signals may be intercepted, resulting in data leaks.

□ Countermeasures:

- ✓ Comply with global privacy regulations such as the General Data Protection Regulation (GDPR) and California Consumer Privacy Act (CCPA).
- ✓ Use end-to-end encryption to prevent data interception.
- ✓ Establish a strict content review mechanism.

□ USPACE opportunities:

- ✓ Develop a highly secure satellite communication protocol to protect data privacy.
- ✓ Provide satellite-level network security monitoring solutions.

□ 监管挑战:

- ✓ 跨国数据流动: 可能违反GDPR等数据隐私法规。
- ✓ 黑客攻击风险: 卫星信号可能被截获, 造成数据泄露。

□ 应对措施:

- ✓ 符合全球隐私法规, 如GDPR、CCPA。
- ✓ 采用端到端加密, 防止数据拦截。
- ✓ 建立严格的内容审核机制。

□ USPACE机遇:

- ✓ 研发高安全性卫星通信协议, 保障数据隐私。
- ✓ 提供卫星级别的网络安全监测方案。

Challenge 4: Market entry and commercial operation permit 市场准入与商业运营许可

□ Regulatory challenges:

- ✓ Market entry requirements vary from country to country, and the approval process is complex.
- ✓ Protection of local enterprises: Some countries set high thresholds to restrict foreign investment.

□ Countermeasures:

- ✓ Reduce market access thresholds through joint ventures, franchising, and other methods.
- ✓ Ensure compliance with national regulations through transparent compliance processes.
- ✓ Adopt flexible business models such as government cooperation and franchising.

□ USPACE opportunities:

- ✓ Cooperate with local enterprises to manufacture satellites or provide technical support.
- ✓ Provide a standardized satellite platform to accelerate customers' entry into the market.

□ 监管挑战:

- ✓ 各国市场准入要求不同，审批程序复杂。
- ✓ 保护本土企业：部分国家设置高门槛，限制外资进入。

□ 应对措施:

- ✓ 通过合资、特许经营等方式降低市场准入门槛。
- ✓ 透明化合规流程，确保符合各国法规。
- ✓ 采用灵活商业模式，如政府合作、特许经营等。

□ USPACE机遇:

- ✓ 与本地企业合作制造卫星或提供技术支持。
- ✓ 提供标准化卫星平台，加速客户进入市场。

Challenge 5: Space law and environmental responsibility

太空法与环境责任

□ Regulatory challenges:

- ✓ Space debris management: Large-scale satellite deployment may exacerbate the problem of space debris.
- ✓ Liability: It is difficult to determine liability in the event of a satellite collision or fall.

□ Responses:

- ✓ Reduce space debris by adopting green materials (wooden materials) or recoverable or self-destruct technologies.
- ✓ Reduce legal risks by purchasing space liability insurance.
- ✓ Ensure compliant operations by complying with international regulations such as the Outer Space Treaty.

□ USPACE opportunities:

- ✓ Reduce space pollution by developing wooden satellites, recoverable satellites and automatic cleaning technologies.
- ✓ Provide satellite insurance solutions to reduce legal liability.

□ 监管挑战:

- ✓ 太空垃圾管理: 大规模卫星部署可能加剧太空碎片问题。
- ✓ 责任追究: 卫星发生碰撞或掉落, 责任界定困难。

□ 应对措施:

- ✓ 采用绿色材料(木质材料), 可回收或自毁技术, 减少太空垃圾。
- ✓ 购买空间责任保险, 降低法律风险。
- ✓ 遵守《外层空间条约》等国际法规, 确保合规运营。

□ USPACE机遇:

- ✓ 研发可回收卫星和自动清理技术, 减少太空污染。
- ✓ 提供卫星保险解决方案, 降低法律责任。

Challenge 6: Government intervention and policy uncertainty

政府干预与政策不确定性

□ Regulatory challenges:

- ✓ Risk of policy changes: Some countries may suddenly adjust their regulatory policies for satellite internet.
- ✓ Internet blocking: Some countries may require the blocking of specific content or restrictions on services.

□ Countermeasures:

- ✓ Strengthen government communication and promote stable regulatory policies.
- ✓ Provide a localised content review mechanism to meet regulatory requirements.
- ✓ Conduct policy risk assessments to reduce uncertainty.

□ USPACE opportunities:

- ✓ Serve as a bridge between the government and businesses to promote industry compliance.
- ✓ Develop software-defined satellite (SDS) to adapt to the regulatory requirements of different countries.

□ 监管挑战:

- ✓ 政策变动风险: 部分国家可能突然调整卫星互联网监管政策。
- ✓ 互联网封锁: 部分国家可能要求屏蔽特定内容或限制服务。

□ 应对措施:

- ✓ 加强政府沟通, 推动稳定的监管政策。
- ✓ 提供本地化内容审核机制, 符合法规要求。
- ✓ 进行政策风险评估, 降低不确定性。

□ USPACE机遇:

- ✓ 作为政府与企业的桥梁, 推动行业合规发展。
- ✓ 研发软件定义卫星 (SDS), 适应不同国家的法规要求。

Summary 总结

- ❑ Opportunities for space companies (such as USPACE) in the satellite internet industry include:
 - ✓ Spectrum and orbit management technology
 - ✓ Secure and compliant data transmission solutions
 - ✓ Locally customised satellites
 - ✓ Space junk management and insurance services
 - ✓ Software-defined satellites (SDS)
- ❑ Through these measures, space companies (such as USPACE) can gain an advantage in the global market and drive the industry towards a safer and more sustainable future.
- ❑ 航天公司（如USPACE）在卫星互联网行业的机遇包括：
 - ✓ 频谱与轨道管理技术
 - ✓ 安全合规数据传输方案
 - ✓ 本地化定制卫星
 - ✓ 太空垃圾管理与保险服务
 - ✓ 软件定义卫星（SDS）
- ❑ 通过这些措施，航天公司（如USPACE）可在全球市场占据优势，推动行业向更加安全、可持续发展的方向发展。