



Legal responsibilities of Space System Operators

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Introduction

- Owners/operators of space systems are exposed to a number of liability risks.
- Broadly speaking, the different types of liabilities are related to:
 - Operations of the space systems
 - Space Debris
 - Use of frequencies
 - Provision of satellite servicesand consequently are related to:
 - Space law
 - Telecommunications law
 - Contract law
- The legal situation differs for public and commercial operators.

- 1. Liability for damage in air or on ground**
- 2. Liability for damage in space**
- 3. Liability for non-physical damage**
- 4. Liability for GNSS signals and services**
- 5. Conclusions and outlook**

Liability risk exposures for damage in air / on ground

- **Liability risk exposures** for damage in air or on ground are associated to **damage caused in the course of the launch of a satellite or in the course of re-entry.**
- Launch failures may have disastrous consequences. In practice, liability risk exposures are, however, rather limited due to the areas where space launches are undertaken and related security and safety measures.
- During re-entry of a space object, liability risk exposures are also limited, as most objects burn down in the atmosphere. Uncontrolled re-entries of very large satellites and manned space stations such as ENVISAT, Rosat and Tiangong 1 may, however, cause significant risks.
- In practice, there seems to be **only one significant precedent** for a claim for damages due to damage in air or on ground.

Liability risk exposures for damage in air / on ground

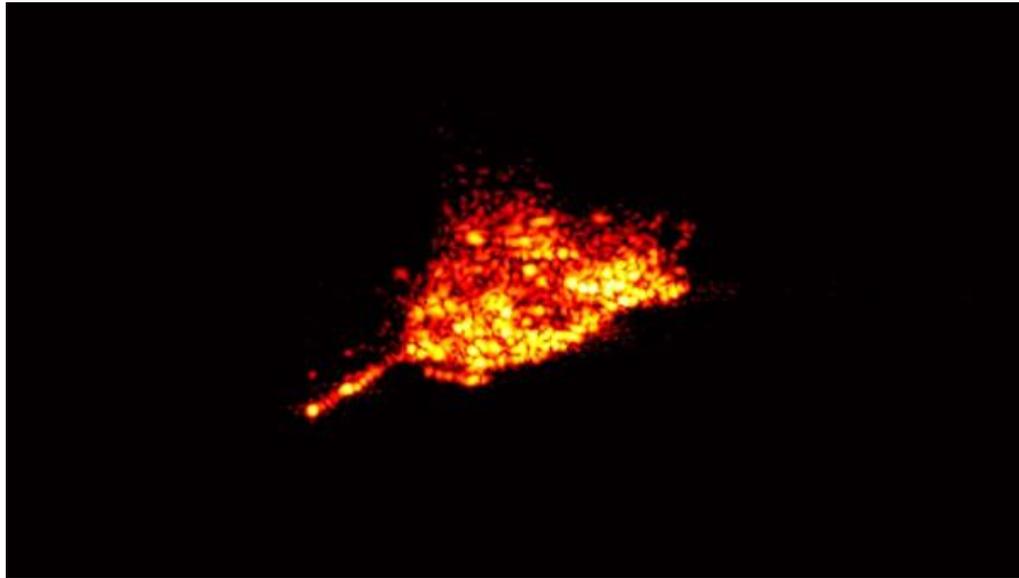
*Kosmos 954 (Russian: Kocmoc 954) was a reconnaissance satellite powered by a nuclear reactor launched by the Soviet Union in September 1977. In January 1978, it reentered the Earth's atmosphere and some of the materials crashed in the desolate, uninhabited Northwest Territories of Canada scattering radioactive debris. The incident prompted an **extensive cleanup operation with an expenditure of C\$14 million** (together with the US, whilst Canada refused the Soviet's offer to assist in the cleanup operations) known as Operation Morning Light. The US did spend some US\$ 2-2.5 million.*

*For the recovery efforts, the **Canadian government billed the Soviet Union C\$6,041,174.70** for actual expenses and additional compensation for future unpredicted expenses. Though Canada and the USSR disagreed on the cause of the incident, the right of the USSR to participate in the cleanup operations, and the costs to be compensated, in April 1981, the **USSR eventually agreed to pay the sum of C\$3 million**. According to the wording of the agreement, it is not fully clear whether or not the USSR did accept the payment on the basis of the 1972 Liability Convention. The **US was not compensated for its expenditures** by any of the parties.*

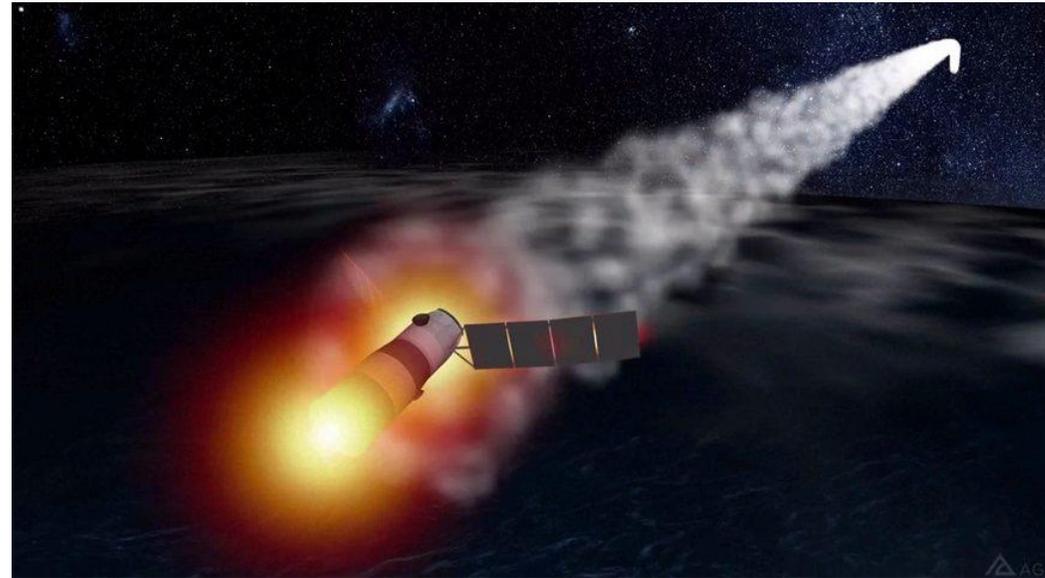


Liability risk exposures for damage in air / on ground

ROSAT reentry



Tiangong-1 reentry



Liability under international space law for damages in air / on ground

- Under Art. II of the 1972 Liability Convention (LIAB), a *launching State* is *absolutely liable* for *damages* caused by its *space object* on the surface of Earth or to aircraft in flight.
- According to Art. I (c) LIAB, the term *launching State* covers
 - A State which *launches* or *procures* the launching of a space object
 - A State from whose *territory* or *facility* a space object is launched
- Today, there is regularly more than one launching State. These launching States are, according to Art. V LIAB, *jointly and severally liable* for any damage caused by a space object.
- *Absolute liability* means liability **without fault**.
- *Damage* covers, according to Art. I (a) LIAB, loss of life, personal injury or other impairment of health; or loss of or damage to property.
- The term *space object* includes component parts of a space object, as well as its launch vehicle and parts thereof.

Liability under international space law for damage in air / on ground

– use case (i)

Lets assume a use case where satellite operators from the UK and from Luxembourg procure the launch of a Ariane 6 launch vehicle from French Guyana.

- In accordance with the concept of a **launching State**, France is a launching State, as the launch was undertaken by a French launch service provider and took place on French territory.
- In accordance with the concept of a **launching State**, the UK and Luxembourg are also launching States, as they procured the launch.
- In accordance with the meaning of the term **space object**, France is the launching State of the launch vehicle, as well as of the payload.
- In accordance with the meaning of the term **space object**, the UK and Luxembourg are the launching States of the payload, as well as of the launch vehicle.

Liability under international space law for damage in air / on ground – use case (ii)

Lets assume that due to a launch anomaly or due to an uncontrolled re-entry property was destroyed and serious environmental damages were caused which, in the long term, led to consequential economic losses.

- According to the concept of *joint and several liability*, the victim can choose any of the launching States to present a claim for damages and according to the concept of *absolute liability*, there is no need to proof that the launching State was at fault.
 - In practice, however, it is often agreed among the parties that on the internal level the launching State whose launch service providers have undertaken the launch shall reimburse the launching States which procured the launch, in case they are held liability for damage that occurred during the launch phase.
 - In turn the launching States which procured the launch shall reimburse the launching State whose launch service providers have undertaken the launch, in case it is held liable for damage that occurred after the launch phase.
- According to the notion of the term *damage*, the victim can present a claim for damages for the property which was destroyed. However, it is a matter of divergence as to whether environmental damages and consequential losses are covered by the LIAB.

Liability under international space law for damage in air / on ground

- non governmental entities

- **Non governmental entities are not subject to international space law** and are accordingly not bound by the LIAB.
- Accordingly, only launching States can be held liable under international space law for damage caused by a space object, including damage caused by a space object of non-governmental entities.
- The liability risks for States under the LIAB can be **flown down to non-governmental entities through the adoption of national space legislation.**
- National space legislation on the licensing of the space activities of non-governmental regularly provides that the **licensee is under the obligation to reimburse the State granting the license, in case it is held liable under international space law** for damage caused by the licensed activity.
- The **scope and content** of these clauses **differs significantly.**
 - Some jurisdictions provide for strict liability caps.
 - Some jurisdictions associate liability caps to the sum of insurance and/or the risks associated to the operations.
 - Other jurisdictions leave it up to the discretion of the licensing authority whether or not a liability cap is established in the license.
- Accordingly, **liability risk exposures** of non-governmental operators may **differ dependent on the jurisdiction where the operations are licensed.**

Example of liability provisions in national space law:

French Law concerning Space Operations:

Article 6.I. – Any operator subject to authorization pursuant to the present act shall have and maintain, as long as it can be held liable pursuant to Article 13 and for the amount set out in Articles 16 and 17, insurance or another financial guarantee approved by the competent authority.

Article 6.II. – The insurance or financial guarantee must cover the risk of having to compensate for the damages that could be caused to third parties to the space operation up to the amount mentioned in the first paragraph.

Article 13 - The operator shall be solely liable for damages caused to third parties by the space operations which it conducts in the following conditions: 1) He shall be absolutely liable for damages caused on the ground or in airspace; 2) He shall be liable only due to his fault for damages caused elsewhere than on the ground or in airspace....

Article 17 - Within the framework set forth in the Finance Act, the authorization granted pursuant to the present Act shall set out, given the risks incurred, the amount respectively below and beyond which the claim for indemnification is exercised and the governmental guarantee is granted, in the case of a damage caused after the launching phase.

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Liability risk exposures for damage in space

- **Liability risk exposures** in relation to damage in space mainly concern **damage caused by collisions in outer space.**
- Due to the dramatically rising number of objects in space **liability risk exposures are increasing.**
 - Numerous large constellations are currently planned and/or implemented.
 - Space debris is becoming a growing concern.
- Up to now, there are **no commonly agreed “traffic rules” in outer space.**
 - There are non-binding standards on the handling and mitigation of space debris (UN, IADC, ITU, ISO etc.)
 - U.S. DARPA (through the CONFER consortium) is currently working on standards for satellite servicing.
- Liability risk exposures/collision risks differ dependent on the orbits used:
 - For GEO satellites, collision risks are (still) relatively low.
 - For LEO satellites, collision risks are higher and it is anticipated that the risk for collisions will even increase, as these orbits get more and more crowded.

Liability under international space law for damage in space

- As for the joint and several liability of launching States, as well as for damage covered by the LIAB the findings of the above section do also apply to damage in space.
- In contrast to liability for damage in air or on ground, liability for **damage caused by one space object to another space object** is based on **fault** (Art. III LIAB).
- If through a collision of two space objects a **space object of a third party is damaged**, the parties involved in the collision are jointly and severally liable based on **fault** (Art. IV (1) b) LIAB).
- In case a collision in space causes **damage to a third party in air or on ground**, the parties involved in the collision are **absolutely liable** (Art. IV (1) a) LIAB).
- For damage to third parties not involved in the collision, the burden of compensation shall be allocated (on the internal level) among the parties involved in the collision in accordance with the extent to which they are at fault (Art. IV (2) LIAB). The third party damaged is, however, entitled to claim the full amount of damages from any of the parties involved in the collision.
- There is **no commonly agreed definition of fault** in terms of the LIAB. International tribunals defined fault as the breach of an obligation.
- May non-binding standards such as the UN/IADC Space Debris Mitigation Guidelines or future non-binding standards on satellite servicing serve as a threshold to determine fault?

Liability under international space law for damage in space

– non-governmental entities

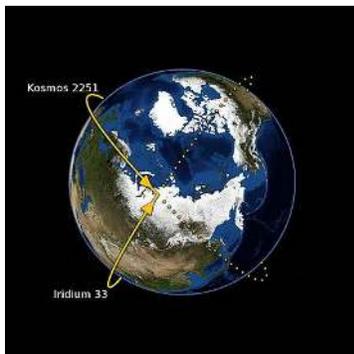
- As with liability under international law for damage in air or on ground, non-governmental entities are not subject to the LIAB.
- Nonetheless, liability risk exposures for non-governmental entities may arise in relation to claims for damages under international law, to the extent that a State takes recourse from a non-governmental entities in accordance with its national space legislation on the licensing of private space activities.
- Liability caps, as well insurance requirements differ from one jurisdiction to another (see above).

Liability under international space law for damage in space

– use cases (i)

Lets assume a collision of a functional space object which is manoeuvrable and a non-functional space object which is not manoeuvrable (Iridium–Cosmos incident).

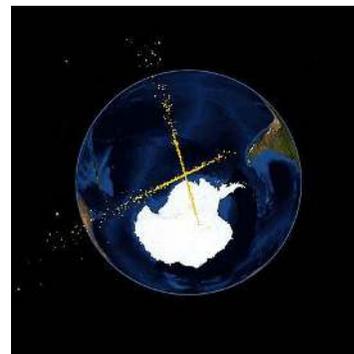
On 10 February 2009, 16:56 UTC, Iridium 33 and Cosmos-2251 collided at a speed of 42,120 km/h and an altitude of 789 kilometer. The collision was the first time a hypervelocity collision occurred between two artificial satellites - until then, all collisions happened between a satellite and a piece of space debris. Cosmos-2251 was a Russian Strela military communications satellite launched on June 16, 1993. It had been deactivated prior to the collision, and remained in orbit as space debris. Iridium 33 was a 560-kilogram commercial satellite launched on September 14, 1997, and was part of the commercial Iridium constellation. The collision destroyed both Iridium 33 (owned by Iridium Communications Inc.) and Cosmos 2251 (owned by the Russian Space Forces). The Iridium satellite was operational at the time of the collision. NASA estimated that the satellite collision created approximately 1,000 pieces of debris larger than 10 centimeters, in addition to many smaller ones. By July 2011, the U.S. Space Surveillance Network had cataloged over 2000 large debris fragments. The ISS did have to perform an avoidance maneuver due to collision debris in March 2011.



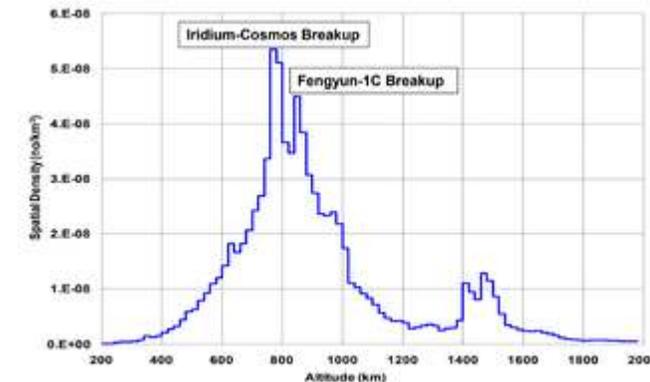
Point of Collision



Debris after 20 min



Debris after 50 min



Liability under international space law for damage in space

– use cases (ii)

- **Non-functional objects are still a space object.** Accordingly, a party may – in theory – claim damages under Art. III LIAB for damage caused by a space object to another space object.
- In practice, it is **difficult to determine fault**.
 - One may claim that the party which failed to undertake a collision avoidance manoeuvre is at fault.
 - On the other hand, it can be argued that the party which disposed a non-functional object in orbit is at fault.
 - It is a matter of divergence whether there is a (binding) obligation under international law to undertake collision avoidance manoeuvres, and whether a State shall not dispose non-functional objects in outer space.
 - It can also be argued that a failure to register a space object with the United Nations (Iridium-33 was not registered) may contribute to a collision.

The **Iridium-Cosmos incident seems to have been resolved by mutual understanding**, as there are no information in the public domain on any claims under the LIAB.

- Some argue that this is based on the fact that the parties realized the weakness of their legal positions due to the uncertainties on the notion of fault.
- It should also be kept in mind that Russia was the launching State of Cosmos 2251 (launched by Russia from its territory) and Iridium-33 (in addition to the US – procured – and Kazakhstan – territory) which was launched from a Russian facility.

Liability under international space law for damage in space

– use cases (iii)

Lets assume that debris generated through the Iridium-Cosmos incident causes damage to another satellite.

- In theory, the victim may claim damages under Art. IV (1) b) LIAB from any of the launching States involved in the Iridium-Cosmos incident, i.e. the Russia, the US, and Kazakhstan based on fault.
- In practice, it might be **difficult to establish fault** bearing in mind the uncertainties elaborated above.

Lets assume that debris generated through the Iridium-Cosmos incident causes damage in air or on ground.

- According to the principle of absolute liability, the **victim does not need to proof fault** and can claim the full amount of compensation from any of the launching States (Art. IV (1) a) LIAB).
- **On the internal level, it might be difficult to allocate the burden of compensation** among the launching States, as this allocation is based on fault. In case they cannot find an agreement on the matter, the burden of compensation is allocated equally (on the internal level) among the launching States.

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Liability for non-physical damage

- **International space law**, as well as its implementation at the national level, is **confined to liability for physical damage** (caused *by* a space object).
- However, there are several other scenarios in relation to claims for damages that may arise from space activities, broadly circumscribed as non-physical damages.
- Non-physical damage may concern,
 - Damage caused by **harmful interference**
 - Damage caused by **service outage or underperformance**
- **Again, the situation may be different for public and for commercial operators.**

Liability in relation to Harmful Interference

- The ITU instruments relevant to spectrum management are the **Constitution (CS)**, the **Convention (CV)** and, mainly, the **Radio Regulations (RR)**.
- These instruments provide
 - the main principles and specific rules governing the frequency spectrum allocation to different categories of radio communication services
 - the rights and obligations of member administrations in obtaining access to the spectrum/orbit resource
 - the framework for the international recognition spectrum/orbit usage rights by recording frequency assignments and, as appropriate, any associated orbits in the Master International Frequency Register (MIFR)
- The ITU legal framework is **binding among ITU Member States** (not directly applicable to private entities).
- However, Art. 6 No. 38 of the CS therefore provides that:
- *The Member States are also bound to **take the necessary steps to impose the observance** of the provisions of this Constitution, the Convention and the Administrative Regulations [i.e. the RR] upon operating agencies authorized by them ...*



Liability in relation to Harmful Interference

- Avoidance of Harmful Interference is one of the priority aims of the ITU Radio Regulations.
- All stations must be established and operated by Administrations or operating agencies in such a manner as **not to cause harmful interference** to the stations of other Administrations (Article 45, Nos. 197 and 198, ITU Constitution).
- Harmful interference may cause substantial damage, e.g. due to service outages or underperformance. Mostly, however, interference will cause indirect and consequential damage, not direct damage.
- In practice, it might be difficult to identify the source of harmful interference.
- Though harmful interference is contrary to the ITU legal framework, there are **no appropriate enforcement measures in place**.



Liability in relation to Harmful Interference

- *RR 15.21 § 13 If an administration has information of an infringement of the Constitution, the Convention or the Radio Regulations (in particular Article 45 of the Constitution and No. 15.1 of the Radio Regulations) committed by a station under its jurisdiction, the administration shall ascertain the facts and take the necessary actions.*
- If the harmful interference persists, the Bureau prepares a report for consideration by the Radio Regulations Board. The Bureau transmits the decisions of the Board to the administrations concerned.
- *RR 15.46 4) The Bureau shall thereafter forward its conclusions and recommendations to the administration reporting the case of harmful interference. These shall also be forwarded to the administration believed to be responsible for the source of harmful interference, together with a request for prompt action.*
- However, the Board has no enforcement powers. The ITU framework also does not know any liability of an administration for damage caused by harmful interference.



Liability in relation to Harmful Interference

- As stated above, the ITU legal framework is only binding among ITU Member States and therefore not directly applicable to private space system operators.
- However, ITU Member States are obliged to take the necessary steps to impose the observance of the provisions of this Constitution, the Convention and the Administrative Regulations upon operating agencies authorized by them.
- Private operators are bound by the respective national laws.
- Within Europe, the Radio Equipment Directive (2014/53/EU) establishes a regulatory framework for placing radio equipment on the market.
- ECC/REC/(04)01: *there is no legal basis to allow that communications be disrupted by jamming devices operated by the public;... it is not possible to construct jammers that comply with the R&TTE or the EMC Directive and therefore such devices cannot be legally placed on the market within the European Union*
- **National telecommunications law** within Europe generally foresees that **frequency assignments (licenses) can be revoked** in case the operator causes harmful interference. Depending on the circumstances (namely for use of jamming), **the operator may also be subject to fines.**

Liability in relation to Services

- Space System Operators may also be **liable towards their clients and users of space services**.
- Again, there are differences for public and private operators.
- **Liability for public space services is sometimes regulated by law**. As one example, see Article 9 Commission Delegated Regulation (EU) No 1159/2013 regarding Copernicus data and services:
 - “*GMES dedicated data and GMES service information are provided to users without any express or implied warranty, including as regards quality and suitability for any purpose.*”
- **Private operators**, however, do not profit from such statutory limitations or exclusions of warranty or liability. They **have to limit their warranty or liability towards their clients by way of contractual arrangements**.
- Generally, space system operators largely exclude any liability towards clients and users of space services in their contractual arrangements.
- Standard type agreement used by satcom operators only foresee that clients receive alternative transmission capacities in case of loss/degradation of a transponder or the entire satellite. Clients may receive a refund for the time the services was not available, in some cases there may be also Service Levels defined which in case of breach may lead to the payment of penalties.

Liability in relation to Services

- Generally, standard type agreement used by EO operators also foresee far-reaching exclusions of warranty and liability, here an example of Digitalglobe:

“LIMITED WARRANTY AND DISCLAIMER. DigitalGlobe warrants to Customer only that the Product, as delivered by DigitalGlobe, will comply in all material respects with the applicable Product Specification. DigitalGlobe’s sole obligation and Customer’s exclusive remedy for a breach of this warranty is for DigitalGlobe, at its option and expense, to: (a) repair or replace the non-conforming Product; or (b) refund all fees paid by Customer for the non-conforming Product. Any claim under this warranty must be made within thirty (30) days following the initial delivery of the Product. This limited warranty is void if any non-conformity has resulted from any accident, abuse, misuse, misapplication or modification of or to the Product by anyone other than DigitalGlobe or any breach by Customer of these License Terms. EXCEPT AS EXPRESSLY WARRANTED IN THIS SECTION 10, THE PRODUCTS ARE PROVIDED “AS IS,” WITHOUT ANY WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED OR STATUTORY, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, NON-INFRINGEMENT OR NON-MISAPPROPRIATION OF INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY, CUSTOM, TRADE, QUIET ENJOYMENT, ACCURACY OF INFORMATION, CONTENT OR RESULTS, OR CONDITIONS ARISING UNDER ANY OTHER LEGAL REQUIREMENT. DIGITALGLOBE DOES NOT WARRANT THAT THE PRODUCTS WILL BE ACCURATE, CURRENT OR COMPLETE, THAT THE PRODUCTS WILL MEET CUSTOMER’S NEEDS OR EXPECTATIONS OR THAT THE OPERATION OF THE PRODUCTS WILL BE ERROR FREE OR UNINTERRUPTED. FURTHER, SPATIAL, SPECTRAL AND TEMPORAL ACCURACY IS NOT GUARANTEED.

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Liability for GNSS signals and services

- **Liability for GNSS signals and services** falls in the category of **liability for non-physical damage**.
- As of today, all global and regional satellite navigation systems are public systems. GPS, GLONASS and the Chinese Beidou have a strong military character, while the European Galileo and all the regional augmentation systems (EGNOS, WAAS etc.) are civil systems.
- GNSS has become central for the global economy and for an ever growing number of applications, including many security and safety applications.
- According to the GSA 2017 Market Report, 5.8 bln GNSS devices are in use in 2017. By 2020, this number is forecasted to increase to almost 8 bln – an estimate of more than one device per person on the planet.
- With the increasing reliance on GNSS, the potential impacts arising from a non-availability of GNSS signals and services increases substantially. Just for the UK, a report concluded that a five-day non-availability of GNSS would have an economic impact of £5.2bn, comprised of £1.7bn in lost Gross Value Added and £3.5bn in lost utility benefits.
- The legal question of liability for damage caused to non-availability and degradation of GNSS systems and related signals/services therefore has increasing practical importance.

Liability for GNSS signals and services

- As explained above, GNSS non-availability or degradation, including related liability, are not regulated by Space Law.
- There is no international treaty or other legal instrument on GNSS.
- US (for GPS), Russia (for GLONASS) and China (for Beidou) have never officially made any declarations regarding potential liability for non-availability or degradation of their respective GNSS.
- However, for the EU Galileo system, the discussion on potential liability already aroused in the early 2000 due to the then envisaged set-up of a Concession (PPP) scheme. Concession negotiations – among others – failed due to the complexity of the discussions on service guarantees, liability and related insurance schemes.
- The specific situation for the EU Galileo led to substantial works, analysis and discussions over the last 15 years or so.

Lots of work has been done...

- EU Galileo Legal Working Group in 2001
- EU Galileo Concession Negotiations (2005-2006)
- Works within International Organisations, namely ICAO (1992-2007)
- Italian Proposal for a Liability Regulation (2006)
- UNIDROIT Initiative (2005-2011)
- French Parliament Expert Group (2011)
- Diverse studies, PhD thesis and articles by legal experts
- Legal Symposia (e.g. BavAIRia/BHO Legal) and Workshops (e.g. ESPI)
- European Commission Consultations with industry (2012-2013)
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- **However, none of these works resulted in any legal instrument.**

Lots of potential approaches were discussed

- International legal instrument
- Statutory limitation of liability
- Contractual limitation of liability
- Liability fund
- (Mandatory) insurance regime
- (Mandatory) certifications
- Differentiation in burden of proof; different requirements of fault
-

Lots of stakeholders with divergent interests:

- EU (owner of assets)
- European Commission (Programme Manager)
- ESA (Design Authority and Procurement Manager)
- GSA (Galileo Service Provider)
- Galileo Services Operator (GSOp)
- FOC Segment Primes (namely Satellite Manufacturer)
- Suppliers and subcontractors
- Producer of Receivers and other GNSS equipment
- Value-Adding and Downstream Service Provider
- International Organisations (ICAO, IMO etc.)
- User of the Services
- Damaged Third Parties
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Earlier statements by the European Commission

- The European Commission, in its Legislative Financial Statement to its proposal for the new GNSS Regulation dated November 2011 (Ref. 3), stated:

“Liability Risks: as with any infrastructure, the two European systems may cause direct or indirect losses to their users or to third parties. The analysis carried out by the Commission reveals that the current state of law applicable does not provide an appropriate legal framework ensuring a fair balance between the interests of the victims and those of the owners and operators of the European satellite radio navigation systems. Appropriate initiatives must therefore be taken, both in Europe and worldwide, to remedy this situation by 2014.” (emphasis added)
- At the same time, the European Commission published a roadmap for a Regulation on GNSS Third Party Liability, underlining that it needs

“to ensure that all conditions to operate and exploit the systems are in place as of the date of introduction of the first positioning services. One of these prerequisites is to clarify the applicable third party liability regime.” (emphasis added)

Current GNSS Regulation and other relevant documents

- However, the GNSS Regulation finally did not contain any specific provision on liability risks.
- Recital 22 provides that:

“operating costs of the systems as estimated for the period 2014-2020 do not take account of unforeseen financial obligations which the Union may be obliged to assume, in particular those relating to liability arising from the performance of the services or Union ownership of the systems, especially with regard to any malfunctioning of the systems. Those obligations are the subject of a specific analysis by the Commission.”
- **As of today, there is no explicit legal provision within EU law dealing with the liability of the EU for Galileo signals and services.**
- However, the Commission took up a **Disclaimer of Liability in the so-called Service Definition Documents and also in so-called Interface Control Documents.** There are several of such documents, both for Galileo and for EGNOS.

Galileo Initial Service - Open Service - Service Definition Document (OS SDD V1.0) – Disclaimer of Liability

*“As the owner of the Galileo system, the **European Union** - including any of its institutions, offices or agencies, such as the European Commission, the European GNSS Agency (GSA), and other entities acting on the basis of a contract or agreement with the European Union involved in the Galileo OS service provision - **does not offer any warranties of any kind** (whether expressed or implied) with respect to the Open Service, including, but not limited to, the warranties regarding availability, continuity, accuracy, integrity, reliability and fitness for a particular purpose or meeting the users’ requirements. No advice or information, whether oral or written, obtained from the European Union - including any of its institutions, offices or agencies, such as the European Commission, the European GNSS Agency (GSA), and other entities acting on the basis of a contract or agreement with the European Union involved in the Galileo OS service provision - shall create any such warranty.*

By using the Galileo Open Service, the user accepts and agrees that the European Union - including any of its institutions, offices or agencies, such as the European Commission, the European GNSS Agency (GSA), and other entities acting on the basis of a contract or agreement with the European Union involved in the Galileo OS service provision - shall not be held responsible or liable for any damages resulting from the use of, misuse of, or the inability to use the Galileo Open Service, including, but not limited to, direct, indirect, special or consequential damages, including, but not limited to, damages for interruption of business, loss of profits, goodwill or other intangible losses, other than in accordance with Article 340 of the Treaty on the Functioning of the European Union.”

EGNOS - Open Service - Service Definition Document (OS SDD V2.3)– Disclaimer of Liability

“The European Union, as the owner of EGNOS system, the European GNSS Agency (GSA) as EGNOS Programme manager and ESSP SAS, as EGNOS services provider, expressly disclaim all warranties of any kind (whether expressed or implied) with respect to the Open Service including, but not limited to the warranties regarding availability, continuity, accuracy, integrity, reliability and fitness for a particular purpose or meeting the users’ requirements. No advice or information, whether oral or written, obtained by a user from the European Union, GSA or ESSP SAS and its business partners shall create any such warranty.

By using the EGNOS Open Service, the user agrees that neither the European Union nor GSA nor ESSP SAS shall be held responsible or liable for any direct, indirect, special or consequential damages, including but not limited to, damages for interruption of business, loss of profits, goodwill or other intangible losses, resulting from the use of, misuse of, or the inability to use the EGNOS Open Service.

Any damage as result or consequence of the use of EGNOS OS Service beyond the conditions and limitations of use set forth in this EGNOS OS SDD shall not be entitled to any claim against ESSP SAS and/or the European Union and/or the GSA.”

Current state of play for the EU Galileo (and EGNOS)

- The legal validity of the above-mentioned disclaimers is rather questionable. The Service Declarations or ICD do neither constitute binding law nor a contractual arrangement between the owner/operator (EU, GSA, GSOp/ESSP) and the users.
- The concept that the user “by using the Galileo (EGNOS Open Service)”... **accepts and agrees that the European Union shall not be held responsible or liable**” would eventually not hold any legal challenge of a user which has experienced a damage.
- In absence of any specific legal or contractual arrangement, the liability of the EU is thus only determined by the general provisions in Art. 340 TFEU:
 - “The contractual liability of the Union shall be governed by the law applicable to the contract in question.
 - “In the case of non-contractual liability, the Union shall, in accordance with the **general principles common to the laws of the Member States, make good any damage** caused by its institutions or by its servants in the performance of their duties.
- In practice, the application of Art. 340 TFEU in case of a damage caused due to the non-availability or underperformance of Galileo/EGNOS signals and services would meet great challenges. Already: what are the general principles common to the laws of Member States?

- 1. Liability for damage in air or on ground**
- 2. Liability for damage in space**
- 3. Liability for non-physical damage,**
- 4. Liability for GNSS signals and services**
- 5. Conclusions and outlook**

Summary and conclusions

- In practice, liability risk exposures for space system operators are relatively low. However, if a case of liability would occur, the amounts in question could be extraordinary, both concerning physical as non-physical damage.
- Risks of liability for damage in air and on ground are still very low, as most space objects burn down upon re-entry. Large space objects implying risks are mostly operated by States (space stations, very large science satellites).
- Liability risk exposures for damage in space are increasing, especially in LEO. Important to note that operators are also responsible for damage caused by non-functional satellites (space debris).
- Liability risks concerning non-physical damage are limited. Regarding harmful interference, the ITU framework does not foresee enforcement measures, nor liability obligations. Under national law, operators causing harmful interference may face the risk of assignment revocation or administrative fines. Regarding satellite services, some laws foresee a statutory exclusions of liability/warranty. Otherwise, operators limit/exclude their warranty or liability risks extensively, by way of contracts with their clients.
- Generally, the **legal situation regarding liability risks differs for public and commercial space system operators.**
- While States (public operators) are directly bound by relevant international law (Outer Space Treaty, Liability Convention, ITU Constitution, Convention and RR), this is not the case for commercial operators. Commercial operators are subject to the national space law (if any) and telecommunications law within the jurisdiction(s) they are operating under.

Remarks and outlook on liability for non-physical damage, including GNSS liability

- National space law establishes liability of private operators for damage in space, in air and on ground.
- Respective approaches, applicable liability caps and mandatory insurance obligations largely differ from one jurisdiction to another.
- For smallsats and large constellations, existing liability and insurance provisions in national space laws are inadequate and may hinder the commercial viability. On the other hand, State liability risks under the Liability Convention persist and may even be greater in case of smallsats (especially in case the satellites have no propulsion systems) or large constellations.
- In the broader context of “NewSpace”, many States currently review their existing laws and in some cases States have already lowered liability/insurance burdens for operators, in order to keep existing/attract new operators and ensure their competitiveness.
- Should this trend continue, there is a clear risk of “forum shopping”. Among other criteria, space system operators may choose their establishment in a State offering most favorable license terms, namely regarding liability and insurance, but also regarding special provisions for new applications such as small launchers, space tourism, satellite servicing or space mining.

Remarks and outlook on liability for non-physical damage, including GNSS liability

- Regarding liability for space services, there still seems to be an **established and recognized practice that operators largely exclude any warranty or liability** by way of contractual conditions.
- However, generally speaking, **the more space services are common and part of larger and converging sectors** such as the digital economy or autonomous systems, **the more will clients demand for effective guarantees regarding service availability and performance.**
- This trend can namely be identified in Earth observation, where the traditional model of data delivery is increasingly replaced by on-line platforms with cloud-based processing and a shift towards the offer of value adding services. The trend is also supported by the long-standing discussions surrounding liability for GNSS signals and services.
- On the other hand, the many factors influencing the availability and performance of space services (e.g. launch failures, sun storms, atmospheric conditions, weather, interference from other sources and so forth) continue to justify specific conditions and solutions.

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