Earth Observation Data and Services – New Legal Issues

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Abstract

The paper provides an overview on recent legal issues in Earth Observation data and services resulting from changes in technologies and markets, which at least some qualify as disruptive. The developments bring some well-known legal issues in Earth Observation into new perspectives. In addition, many typical legal issues in the IT and E-commerce sectors become now directly relevant in Earth Observation.

The market for Earth Observation data and services is changing dramatically. Around the world, government agencies and commercial companies are investing in new Earth Observation satellites, sometimes including large constellations of small satellites. The rise of Earth Observation satellites goes along with a massive increase in available data. Overall, the Earth Observation market is showing positive developments, with average yearly growth rates of 10% or more. Earth Observation data and services are now increasingly provided via the internet, through online platforms with typical e-commerce type elements. Cloud computing services are used to handle the massive data volumes to be accessed via such platforms. Generally, we see a slow shift from the traditional data provision approach based on data licenses to more comprehensive services based on contracts and related Service Level Agreements (SLA). From the legal perspective, the above-described technology and market developments do not raise previously unknown issues. Commercial E-commerce platforms and Cloud Computing services have been introduced since several years and the legal issues related to them have been tackled by legislation, codes of conduct and business practice. However, the transposition to and use within the Earth Observation sector raises challenges for institutional and commercial stakeholders. In addition, some well-known legal issues in Earth Observation come into new perspectives. This includes data policies, copyright, data licensing, personal data protection, standardization and interoperability, as well as warranty and liability for Earth Observation data and services. The paper provides an overview from a European perspective.

1. Introduction

The market for Earth Observation (EO) data and services is changing dramatically. Around the world, government agencies and commercial companies are investing in new EO satellites, sometimes including large

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constellations of small satellites. According to Euroconsult, more than 400 EO satellites are expected to be launched during the next decade, generating $35.5 billion in manufacturing revenues.[1] While most of the satellites will be for governmental purposes, a significant growth in commercial satellites is also expected. The number of countries with EO programmes is scheduled to increase from 35 to nearly 50.

The rise of EO satellites goes along with a massive increase in available data. According to ESA, one million data products under the Copernicus programme were generated during 2017 within one single quarter.[2] With the growing fleet of Sentinels, petabytes of data are produced per year. According to Euroconsult, the commercial data market is expected to increase from $1.7 billion in 2015 to $3 billion in 2025.[3] The huge amount of data requires novel approaches for storage, archiving, and distribution.

The market for EO services is also showing positive developments, with average yearly growth rates of 10% or more.[4] This market is formed by several sub-segments, including data supply, data (re-)distribution, value adding services, consultancy, hard- and software, and ground station operations. Within these elements, the market for value-added services reached $3.2 billion in 2015 and is growing at a faster rate than the data supply market.[5] Value adding services traditionally are bespoke, delivered upon individual customer request in dedicated projects. However, the market shifts to online services with new business models, such as automated delivery of regular updates. According to a stakeholder consultation undertaken by EARSC, the market share of EO online services is estimated to grow rapidly, from less than 5% of the overall EO services market today to around 25% in 5 years.[6]

EO data and services are increasingly provided via the internet, through platforms with E-commerce type elements. To handle the massive data volumes, such platforms are backed with Cloud computing services. Such

1 Euroconsult, Earth Observation Manufacturing, Data Markets Continue Expansion, 2016, under http://www.euroconsult-ec.com/15_September_2016.

2 ESA, Copernicus Data and Information Access Service (DIAS) – Industry Information Day, 2016, under http://emits.sso.esa.int/emits-doc/ESOC/DIAS/DIAS_Industry_Info_Day_ESRIN_20Dec2012.pdf.

3 Euroconsult, Earth Observation Manufacturing, Data Markets Continue Expansion, 2016, under http://www.euroconsult-ec.com/15_September_2016.

4 Satellite Industry Association, State of the Satellite Industry Report, 2017, under http://www.sia.org/wp-content/uploads/2017/07/SIA-SSIR-2017.pdf.

5 Euroconsult, Earth Observation Manufacturing, Data Markets Continue Expansion, 2016, under http://www.euroconsult-ec.com/15_September_2016.

6 EARSC, Establishing A European Marketplace for EO Services, 2017, under https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&cad=rja&uact=8&ved=0ahUKEwi97uOqrc3XAhVDJFAKHblbAM8QFgg5MAI&url=http%3A%2F%2Fearsc.org%2Ffile_download%2F418%2FMAEOS%2Bfinal%2Bpresentation%2B20170125.pdf&usg=AOvVaw1nyd0Q4Jo66xgZsPbuoGfg.

Cloud computing services are used for data storage and long-term archiving. More and more, for handling data access and distribution as well as for data analytics, processing, visualisation and value adding. Some elaborate platforms comprehensively offer all such functionalities. Users do not have to download the data to subsequently process them within their own laboratories and with their own value-adding tools; all these processes of the value chain can now be handled online.

Within Europe, Cloud-based EO platforms are within the focus of governmental and commercial stakeholders. To improve the access to Copernicus data, the European Commission and ESA have procured four parallel Cloud platforms (Copernicus Data and Information Access Service, the so-called DIAS) and one additional DIAS is set-up by EUMETSAT. In addition, ESA has so far set-up seven so-called Thematic Exploitation Platforms (TEPs). Numerous EU/ESA member states are implementing national Copernicus platforms, building upon earlier activities within the so-called Copernicus Collaborative Ground Segment. Commercial players are establishing Cloud-based EO platforms of distinct types and purposes.

The strong need for cloud computing services adds new stakeholders to the EO market. Over the last years, several large IT players such as Google, Amazon, T-Systems, ATOS, or SAP have developed special solutions for EO (or, more broadly, geospatial) data and services. Similar solutions are also being developed by major players in the geospatial market such as Hexagon or ESRI. These new players indicate that the EO market starts to move out of its relative isolation and becomes part of the broader geospatial, data, and information markets. Technology convergence goes hand in hand with market convergence.

From the legal perspective, the above-described developments generally do not raise previously unknown issues. Commercial E-commerce platforms are widespread and show similar approaches and functionalities as the specialized EO platforms. Specific legal issues of such platforms include E-commerce, consumer rights, and e-privacy (section II), cloud computing (section III), open source software (section IV), or liability for third-party content and hyperlinks (section V). In addition, other well-known legal issues in EO come into new perspectives. This includes data policies, copyright, data licensing (section VI), personal data protection (section VII), standardization and interoperability (section VIII), as well as warranty and liability for EO data (section IX). The following analyses of these legal issues will focus on EU and national laws of EU member states.

2. E-Commerce, consumer rights, and e-privacy

EO online platforms are websites accessible on the Internet via web-browsers. Accordingly, they must include various information as prescribed by relevant

EU and national laws of EU member states. Mandatory information mainly relates to:

- "Imprint" (including, but not limited to, provider identification etc.),[7]
- provision of a "Privacy Policy" (information on personal data protection"),[8]
- specific information on the use of "Cookies".[9]

Where platforms enable the purchase of data, tools and services, the operators of such platforms also have to comply with applicable E-commerce laws. This mainly concerns:

- information related to the conclusion of contracts by electronic means,[10]
- obligations regarding the placement of an order by electronic means.[11]

Where EO products and services are also offered to consumers,[12] distance-selling laws in EU member states by virtue of the Consumer Rights Directive may apply.[13] In particular, the following rights and obligations are to be taken into account:

7 Article 5 of Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (E-Commerce Directive).

8 See Article 5 para. 3 of EU Directive 2002/58 on Privacy and Electronic Communications (E-Privacy Directive) in its version amended by Directive 2009/136, which in general provides that the use of cookies is only allowed on condition that the subscriber or user concerned has given his or her consent, having been provided with clear and comprehensive information, in accordance with Directive 95/46/EC, inter alia, about the purposes of the processing.

9 Applicable national laws (e.g. Section 13 of the German Telemedia Act) by virtue of the Data Protection Directive 95/46/EC set out the obligation of a service provider to provide information on the collection, processing and use of personal data in terms of the Directive.

10 Art. 10 (1) – (3) E-Commerce Directive.

11 Art. 11 (1), (2) E-Commerce Directive.

12 The definition of the term "consumer" in Article 2 para. 1 of the Directive on Consumer Rights (2011/83/EU) reads: "'consumer' means any natural person who, in contracts covered by this Directive, is acting for purposes which are outside his trade, business, craft or profession.".

13 Directive 2011/83/EU of the European Parliament and of the Council of 25 October 2011 on consumer rights, amending Council Directive 93/13/EEC and Directive 1999/44/EC of the European Parliament and of the Council and repealing Council

- pre-contractual information duties in consumer contracts,[14]
- information and related duties in distance and off-premises contracts,[15]
- the right of withdrawal from such contracts.[16]

The obligations imposed by the previously mentioned legal frameworks apply both to the operators of the EO platforms and to any third party offering EO data, tools, and services on such platform. This is especially relevant for EO platforms with marketplace functionalities, where commercial providers can set up their own web-stores on the platform for are value-adding products and services directly to their customers.

3. Cloud Computing

Cloud computing supports the shift from simple data download towards fully-fledged E-commerce type platforms with virtual workspaces, where data can be uploaded, analysed, merged, and processed with the help of software tools. The applicable EU and national legal frameworks for Cloud computing are complex. Most relevant are the new EU General Data Protection Regulation,[17] the E-Privacy Directive,[18] the E-Commerce Directive,[19] as well as the Directive on security of network and information systems (NIS Directive).[20] A proposal for a Directive on certain aspects concerning contracts for the supply of digital content will become relevant, if and once adopted.[21]

Directive 85/577/EEC and Directive 97/7/EC of the European Parliament and of the Council (Consumer Rights Directive).

14 Art. 5 Consumer Rights Directive.

15 Art. 6 – 8 Consumer Rights Directive.

16 Art. 9 – 16 Consumer Rights Directive.

17 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

18 Directive 2002/58/EC of the European Parliament and of the Council of 12 July 2002 concerning the processing of personal data and the protection of privacy in the electronic communications sector, revised by Directive 2009/136/EC of the European Parliament and of the Council of 25 November 2009 (E-Privacy Directive).

19 Directive 2000/31/EC of the European Parliament and of the Council of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (E-Commerce Directive).

20 Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union (NIS Directive).

21 Proposal for a Directive of the European Parliament and of the Council on certain aspects concerning contracts for the supply of digital content, COM/2015/0634 final – 2015/0287 (COD).

Cloud computing raises numerous legal challenges, including data ownership, data security, data protection, storage location, portability, performance obligations, warranty, and risk of provider lock-in. Concerns regarding these issues are still hampering the wide use of cloud computing in Europe, especially by public authorities. Contracts for cloud computing services need to cover these issues. While best practices exist, and certain harmonization work is undertaken, terms and conditions of Cloud computing services contracts strongly differ. Generally, contractual obligations must be flexible enough to cope with technology advances, emerging threats, and changing requirements.

4. Open Source Software

Open source software (OSS) is increasingly employed in EO for processing and value adding of EO data. This trend is expected to continue, as the use of OSS saves development and maintenance costs for the individual users, avoids lock-in situations with the original creator(s), facilitates rapid evolution, and encourages reuse. However, the use of OSS may also involve certain drawbacks, mostly caused by a lack of awareness by both developers and users of the characteristics of open source, applicable license conditions, and resulting legal implications.

Many users of OSS assume that such software can be used without restrictions. However, OSS is copyright protected and the term "open" itself does not have the meaning of "unconditional." OSS is subject to license terms, which have to be accepted by the user. Without such acceptance, the use of OSS is prohibited. License conditions typically impose so-called copyleft or share-alike regimes and stipulate exclusions of warranty and/or limitations of liability. The various open source licenses however differ from each other in many ways. Some open source licenses limit free use and, for example, exclude the right to amend the software for commercial purposes, while other open source licenses do not limit the use of the software at all. Some licenses have a strict copyleft regime (allowing the user only to distribute derivative works under the very same license), while other licenses use the "share-alike" approach (allowing the distribution also under a "compatible" license).

5. Liability for third party content and hyperlinks

EO online platforms with marketplace functionalities provide content of the different service providers present on the platforms. The question thus arises whether and to what extent the operators of such platforms – so called intermediaries – can be held liable for the third-party content. As a rule, intermediaries are exempt from liability for third party content, have no general obligation to monitor such content, and have no general obligation to

seek circumstances indicating illegal activities.[22] However, the more the content is redacted or compiled by the intermediaries themselves, the more it becomes questionable whether the content is still to be qualified as third-party content. In a case that was concerned with the limits of the above mentioned exemptions, the European Court of Justice (ECJ) held that the exemptions shall not apply if the operator of a website "plays (an) active role of such a kind as to give it knowledge of, or control over, the data relating to those offers for sale," e.g. by optimizing the presentation of the offer, and shall also not apply "if it was aware of facts or circumstances on the basis of which a diligent economic operator should have realised that the offers for sale in question were unlawful and, in the event of it being so aware, failed to act expeditiously."[23] In practice, this has led to the establishment of so-called "notice and take-down" procedures, meaning that operators of an online marketplace have to remove infringing offers upon receipt of corresponding notifications by right owners.

As with every website, EO online platforms may provide hyperlinks, some of which are to third party online services and some of which are for advertisements. The responsibility of the platform operator for such hyperlinks is of particular concern for matters such as third-party intellectual property rights (IPR) and personal data protection. According to recent jurisprudence of the ECJ,[24] the operator of a website who does not pursue a profit can generally not be held responsible if the linked website contains works published without the consent of the rightsholder, except when it is established that the operator knew or ought to have known that the hyperlink he posted provides access to such illegal content.[25] When a website is operated for profit, the operator that posts a hyperlink is, according to the ECJ, under the obligation to carry out the necessary checks to ensure that the hyperlinks do not provide access to "illegal" content.[26] Up to now, the scope and content of this obligation is rather ambiguous. Under German law, recent jurisprudence of the Regional Court of Hamburg[27] provides some guidance on the question when the posting of a hyperlink is carried out for profit. The Court held that every link that is posted on a website may fall under this criterion, as long as the website as such is operated for profit. Accordingly, the obligation to undertake the necessary checks may, in principle, apply to every link posted on an EO online platform, as long as the platform is operated for profit. This may also concern advertisements linking to other websites. In a more recent verdict on the matter, the Regional Court

22 Art. 15 Directive E-Commerce Directive.
23 ECJ, Case C-324/09, para. 116 and 124.
24 ECJ case C-160/15 (GS Media).
25 ECJ case C-160/15 (GS Media), para 47-50.
26 ECJ case C-160/15 (GS Media), para 51.
27 Regional Court of Hamburg, 18.11.2016, Az. 310 O 402/16.

of Hamburg held that the obligation to undertake the necessary checks shall not apply if the necessary checks are unreasonable for the operator of a website, taking into account the particularities of the case in question.[28]
In contrast to wide public perception, website disclaimers setting out that the operator of an EO online platform is not responsible for content on linked websites are neither mandatory, nor valid without an express agreement by the users.

6. Data policies, copyright and licenses

Data policies set the high-level principles of how EO data are provided and can be used. They provide the framework for more detailed provisions contained in data licenses. Data policies are mostly used by public mission operators, commercial operators directly employ standard licenses or contracts. There is a general trend for public EO data to be provided under open data policies. These policies, however, differ significantly in approach, scope, definitions and content. This does not cause that many difficulties, as long as the user is accessing only one particular data set from one mission. On EO online platforms, users can however combine datasets from multiple mission – each of which may be subject to a dedicated data policy.
Data policies generally establish that the mission operator (or data owner, if separate) retains ownership of the relevant data. Furthermore, data policies usually state that the mission owner holds the relevant intellectual property rights, namely copyright. Even though many aspects of copyright laws have been standardized through the Berne Convention for the Protection of Literary and Artistic Works,[29] as well as through EU Directives,[30] copyright laws vary substantially by country. This implies challenges for EO data owners, especially where data can be used world-wide without geographical restrictions.
National copyright laws generally require intellectual creation with a minimum level of originality. Accordingly, automatically generated data such as raw data from EO satellites are generally not protected under national copyright laws. Processing and value adding steps are now also increasingly run by automated software applications. The trend of automatization will accelerate with Cloud-based platforms providing virtual workspaces. Whether

28 Regional Court of Hamburg, 13.06.2017, Az. 310 O 117/17.
29 1886 Berne Convention for the Protection of Literary and Artistic Works, drafted on 9 September 1886, completed in Paris on 4 May 1896, revised in Berlin on 13 November 1908, completed in Berne on 20 March 1914, revised: Rome 2 June 1928, Brussels 26 June 1948, Stockholm 14 July 1967, Paris 24 July 1971 and amended on 28 September 1979, under http://www.wipo.int/treaties/en/text.jsp?file_id=283698.
30 Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society.

or not processed data and final products are still copyright protected under the applicable law therefore requires individual evaluation, leaving significant uncertainties for the data owners. The protection of databases under the EU Database Directive[31] provides a certain leverage. However, this protection also has uncertainties due to the divergent implementation at national level, as well as regarding protection outside of EU territory.

Licenses are the instruments for implementing applicable data policies. As copyright protection is increasingly questioned also for processed data and final products, effective license management through the whole distribution chain becomes even more important to protect the ownership rights of the mission operator.

From a user perspective, understanding, accepting, and observing multiple EO data licenses with divergent provisions is challenging. The existence of multiple data licenses becomes a critical issue, when data sets from numerous sources are to be merged and processed towards final products or services. These products or services will incorporate the accumulated restrictions imposed by each source data set. Therefore, any restrictions, including copyleft provisions, need to be properly tracked and complied with. This may become a serious obstacle especially for commercial exploitation. The European Commission and ESA have initiated a working group with commercial EO data providers to identify ways of potential harmonization of licenses, facilitating interoperability.

Landsat data in the United States are made accessible without a license and some consider this as a suitable model also within the EU. However, waiving the requirement of a data license may also have drawbacks. Licenses typically include contractual limitations of warranty and/or liability. Absence of a license, as far there are no statutory limitations under the applicable law, would result in unlimited warranty and liability on the data provider. Furthermore, as at least certain EO data may be copyright protected, an explicit license is required, in order to grant the user the respective usage rights. Without a license, the use could constitute an infringement of the copyright and would violate the applicable law. As the copyright situation for a specific data set is not clear, a no license approach could create significant uncertainty to the users. Such a situation does not, however, apply for Landsat data, as these are public domain data of the U.S. government and by statute not subject to copyright.

7. Personal data protection

Objectively, EO data per se are not very sensitive regarding personal data. The most advanced commercial imaging sensors provide a spatial resolution

31 Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases (Database Directive).

of around 30 cm (WorldView-3 image data from DigitalGlobe). With such resolution, it is not possible to directly identify an individual person from space. Due to the high speed of low-orbiting satellites, a specific scene can only be captured for a short time – it takes then at least one orbit until revisit. Therefore, it is not (yet) possible to "track" movements of individuals in real-time. However, high-resolution optical data, at least with very-high spatial resolution, may have the same quality as aerial photography and therefore may raise respective privacy issues. In addition, EO data may be combined with other data sets and the final products or services may raise privacy concerns, even if the raw or pre-processed input data itself do not.

Over the past years, there has been a growing sensitivity in the general public regarding geospatial data. Overestimating the capacities of EO systems, media talk about "spies in the sky" or even of "paparazzi satellites." People are concerned about images on Google Earth or Google Street View showing their private houses, gardens, or car parking.

Since 25 May 2018, the EU General Data Protection Regulation[32] became applicable. Guidelines for the interpretation and application of the European legal framework are from time to time issued by the European Data Protection Board (formerly the so-called Art. 29 Working Party) composed of representatives from the Commission, other EU bodies and the data protection authorities of all Member States. The Art. 29 Working Party already issued opinions on cloud computing, drones, on geolocation services on smartphones, on the reuse of public sector information, and big data.[33] So far, no specific opinion or statement has been given regarding EO satellites or geospatial data more generally.

Some indications on privacy issues in relation to EO data may, however, be derived from works by national authorities. A German data protection authority, ULD – the data protection authority of Schleswig-Holstein, presented in a 2008 study the view that optical EO data of a spatial resolution of up to 40 cm pixel size are not suitable to violate personal data protection interests of a data subject.[34] More recently, the ULD tends to apply an even more relaxed approach proposing a threshold of 20 cm pixel size resolution.[35] The German Council for Social and Economic Data has also

32 Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

33 An overview on the opinions and recommendations is available under http://ec.europa.eu/justice/data-protection/article-29/documentation/opinion-recommendation/index_en.htm.

34 ULD, Datenschutzrechtliche Rahmenbedingungen für die Bereitstellung von Geodaten für die Wirtschaft, Gutachten im Auftrag der GIW Kommission, 22 September 2008, 67.

35 Weichert, Geodaten – datenschutzrechtliche Erfahrungen, Erwartungen und Empfehlungen, in: Datenschutz und Datensicherheit 2009, 347, 347.

adopted the 20 cm threshold.[36] The above does not mean that EO data of a spatial resolution of less than 40/20 cm automatically are of concern for personal data protection. It rather provides that up to limit 40/20 cm an individual does generally not have a legitimate interest of data protection.[37]
Even if EO data can be considered personal data, the lawfulness of its processing in general depends on the purpose of such processing. For example, while the processing of personal data for the purpose of contract management can be considered lawful, the processing of the very same data for the purposes of personalised advertising may be unlawful (without the data subject's prior consent). Accordingly, the lawfulness of the processing of personal data in the context of EO services has to be reviewed on a case-by-case basis. For EO online platforms, platform operators need to comply with the applicable personal data protection laws, when processing user data for registration, identity checks, and user account management.

8. Standardization and interoperability

Data do not exist in a vacuum. To be useful, data must be accompanied by context on how they are generated, captured, calibrated, processed, and validated along with other information that enables their proper interpretation and use. Users require a solid foundation of such contextual information in order to verify data validity, accuracy, and reliability. This is vital for the creation of accurate value adding products and services. Appropriate technical and normative approaches are required to identify, capture, and track all necessary details to this end. In practical terms, this means that the metadata and further contextual information describing all the steps in the chain have to be made available in transparent way, so that users can easily check them. Compliance with recognized standards and interoperability across the different data sources play important roles in this respect. This will become even more important for EO products and services merged from several data sources. Today, there is however only partial convergence on standard ways of holding and transferring EO and other geospatial data and information.
Common standards are mainly developed by the Open Geospatial Consortium (OGC). The OGC has led the way in creating several important geospatial standards including the Network Common Data Form (NetCDF), the OpenGIS Standard for Web Processing, and the OGC Web Services Common Standard. These standards are implemented in many GIS systems, notably ESRI's ArcGIS, and in the ESA SNAP toolbox.

36 Rat für Sozial- und Wirtschaftsdaten: Georeferenzierung von Daten, 2012, 50; and also the same: "Endbericht der AG "Georeferenzierung von Daten" des RatSWD, 2012, 43.
37 Weichert, Geodaten – datenschutzrechtliche Erfahrungen, Erwartungen und Empfehlungen, in: Datenschutz und Datensicherheit 2009, 347, 350.

Regarding metadata, the Committee on Earth Observation Satellites (CEOS) International Directory Network (IDN) Master Directory provides free, online access to information on scientific datasets in the Earth sciences, including EO. This metadata describes data held by government agencies, multinational organizations, and other organizations all over the world. It is maintained using the standard Directory Interchange Format (DIF) and Service Entry Resource Format (SERF). CEOS further contributes to standards and interoperability within the Global Earth Observation System of Systems (GEOSS).
In Europe, the INSPIRE Directive[38] has a key influence on standards and interoperability for geospatial data. Beneath the level of the Directive, there are several Implementing Rules, which are adopted as Commission Regulations/Decisions.[39] For the access to and processing of EO data, the most relevant Implementing Rules are those concerned with:

- Metadata,
- Interoperability of spatial data sets, and services,
- Data and service sharing.
- Implementation of the INSPIRE framework on the level of Member States is rather slow.

The variety of standards for EO data provide a technical challenge to users. But there are also legal implications, namely regarding warranty and liability of the data provider. In case users do not have access to metadata and necessary contextual information, they may come to wrong expectations or interpretations regarding the validity or accuracy of the data, leading to wrongful conclusions and resulting actions. The same applies, when the metadata and information is incomplete, outdated, or inaccurate. Users (or third parties) may base claims on the data provider´s breach of professional duty of care.

9. Warranty and liability

The provision of EO data, as with geospatial data more generally, is faced with uncertainties regarding warranty and liability risks. So far, liability claims by users or third parties have been rare. The few known cases around

38 Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 established an Infrastructure for Spatial Information in the European Community (INSPIRE).

39 Implementing rules have been adopted on: Metadata, interoperability of spatial data sets and services, Network Services, Data and Service Sharing and Monitoring and Reporting. The documents are available under http://inspire.ec.europa.eu/index.cfm/pageid/3.

the world mostly relate to aeronautical or maritime charts or to traditional maps and do not create sufficient precedence. However, a broader perspective into the geospatial sector shows the relevance of the matter; advances in technologies for data dissemination and new business models indicate increasing risks for the future.

Far-reaching limitations or even exclusions of warranty and liability for EO data are still standard, both for public and commercial data. Respective license conditions aim to protect mission operators, data owners, and data distributors from warranty claims by users regarding the availability, transmission, accuracy, completeness of the data, or their fitness for a particular purpose. At best, the data provider commits to repair or replace defective data sets upon notice by the user. Further, license conditions aim to protect from liability claims for damage arising in relation to the use of the data, sometimes including infringement of third party IPR.

The validity of license terms largely depends on the applicable national law. Very broad exclusions or limitations may not be enforceable in all cases, for example when related to damage to health or death of persons or where extending to damage caused by wilful misconduct or gross negligence. The best practical way to mitigate warranty and liability risks is to provide as much information (e.g. metadata, contextual information, user manuals, etc.) as possible on the data and tools in a transparent and understandable way, enabling the user to assess data provenance, generation, and processing steps regarding validity, accuracy, and reliability.

As to now, users seem to accept the exclusions/limitations of warranty and liability in data licenses. However, three considerations justify prudence regarding future developments. First, there is a general trend in the EO sector to move from licenses for the provision of individual data towards more comprehensive EO services contracts. While limitations of warranty and liability may be regarded as appropriate for individual data (especially where provided free of charge), this is not the case for the provision of EO services. Second, the EO sector becomes more and more part of the broader geospatial and ICT sectors. As convergence continues, the attitude and practice regarding warranty and liability may change. Finally, far reaching exclusions of warranty and liability may hinder the growth of the commercial EO market. Customers will more and more expect warranty for products delivered, as well as performance obligations for services provided. Value adding providers however have often no possibility of taking recourse against the input data providers due to respective license terms.

10. Conclusions

The evolution of the EO market changes the legal framework considerably. Following technical convergence and the growing advent of EO online services, EO becomes part of the larger data and digital economy.

Consequently, relevant legal issues fall under IT law much more than under international or national space law. The issues are not necessarily new; the challenge is how to apply existing regulations and best practices from the IT to the EO market.

In addition, it might be required to rethink some of the heritage legal issues in EO. As described, the growing automatization in data acquisition, processing and value adding reduces the availability of copyright protection under the applicable law. However, individual licenses hinder the use and merging of data from multiple sources. Data interoperability requires more harmonized licensing conditions. The growing combination of EO data with other data sets may raise privacy concerns. The shift from data supply to service contracts will likely change the approach regarding limitations of warranty and liability. Public as well as commercial satellite operators, data distributors, platform providers, and value adding service companies all have to find reliable answers to these issues.