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A Star(link) Is Born: What
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Abstract [En]: This study looks at the solutions set forth in both the European Electronic Communications Code and the Digital Agenda for Europe in the effort to guarantee the right to broadband Internet access in rural areas, arguing that these solutions are inadequate in closing the digital divide between rural and urban areas. What seems to be looming on the horizon, then, when it comes to broadband internet access in rural areas, is the singular prospect of a twofold failure: a market failure coupled with a public sector failure. But it is well appreciated that things change rapidly in the world of electronic telecommunications, and so if this conclusion may have been accurate even only a few months ago, it is no longer accurate today. And the reason for it, I submit, is the technological revolution introduced by Starlink.

Abstract [It]: Lo studio evidenzia che le soluzioni individuate tanto dal Codice Europeo delle Comunicazioni Elettroniche che dall'Agenda Digitale europea per garantire il diritto di accesso a Internet in banda larga nelle zone rurali non sono idonee a colmare il divario digitale rispetto alle aree urbane. Un duplice quanto singolare fallimento sembra, dunque, delinearsi nel servizio di accesso a Internet in banda larga nelle zone rurali: quello del mercato e quello dell'intervento pubblico. Ma è risaputo che le cose cambiano rapidamente nel mondo delle comunicazioni elettroniche e questa conclusione, che sarebbe stata valida solo qualche mese fa, non lo è più oggi in forza della rivoluzione tecnologica prodotta da Starlink.

Keywords: Starlink; rural areas; right to broadband internet access; digital divide; SpaceX

Parole chiave: Starlink; aree rurali; diritto di accesso a Internet in banda larga; divario digitale; SpaceX

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1. Premise

«There is some soul of goodness in things evil, would men observingly distil it out», writes Shakespeare in Henry V.

The COVID-19 pandemic has got us to fully appreciate why it is essential to make sure that everyone across the EU has access to broadband internet regardless of where they happen to live¹.

* Articolo sottoposto a referaggio.

¹ «The COVID-19 pandemic has radically changed the role and perception of digitalisation in our societies and economies, and accelerated its pace. Digital technologies are now imperative for working, learning, entertaining, socialising, shopping and accessing everything from health services to culture. [...] Excellent and secure connectivity for everybody and everywhere in Europe is a prerequisite for a society in which every business and citizen can fully

In what follows, we will be scrutinizing the solutions the EU has devised to guarantee broadband internet access in rural areas. It will be argued that these solutions are inadequate to close the digital divide, but then we will be considering how that goal might be achieved, either closing or narrowing that divide, with the help of some revolutionary developments in satellite telecommunications technology.

2. The Legal Framework: The Principle of the Social Market Economy

The theory of the social market economy was developed by the Freiburg School (Wilhelm Röpke, Walter Eucken, Ludwig Erhard)². What this theory envisions is a hybrid model on which, on the one hand, the production of goods and services is primarily entrusted to private entities in a competitive free-market economy, while, at the same time, the public sector is entrusted with protecting and promoting competition and with intervening to address market failures by providing relief to private entities in distress so as to secure the general welfare.

This stands as a core principle of the European system (art. 3, paragraph 3 TEU). A clear application of this principle can be found in the legal framework governing services of general economic interest.

2.1. Services of General Economic Interest

Services of general economic interest (SGEI) are governed by artt. 14 and 106, paragraph 2 TFEU, but nowhere in these provisions are SGEIs defined. For a definition we have to turn to sector-specific laws - the directives and regulations governing specific SGEIs - from which it can be gathered that these services consist of (a) economic activities that (b) are necessary to guaranteeing consumer protection rights.

(a) In order for a service of general economic interest to qualify as economic, it needs to be offered in exchange for consideration, that is, for payment (the price that consumers pay for the service). If a service is funded by taxpayer money (as in the case of public education or health care), it does not count as an SGEI.

(b) There are no consumer rights absent any correlative duties owed by consumer-facing private enterprises. That an economic activity is in this sense necessary or mandatory (the object of a duty) means that if the market should fail, the government must step in guarantee that service, not necessarily by providing the service directly but by making sure that there is a marketplace in which consumers can access it.

participate», “2030 Digital Compass: The European Way for the Digital Decade”, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, 9.3.2021 COM(2021) 118 final, pp. 1-5.

² The theory also goes by the name of ordoliberalism, after *ORDO*, the title of the journal that Eucken founded in 1940. See F. FELICE, *L'economia sociale di mercato*, Rubbettino, Catanzaro, 2009, *passim*.

This public guarantee in the event of a market failure takes the form of the government making it a requirement to provide universal services³, under a scheme in which an unprofitable business required to provide the service in question may receive some form of compensation (financial or otherwise), and thus be put on an even playing field without violating the rules of fair competition⁴.

The concepts of a service of general economic interest and of universal service find broad application in EU law governing electronic communications.

2.2. Universal Service in the European Electronic Communications Code

In the European Electronic Communications Code - Directive (EU) 2018/1992 (hereinafter the “Code”, for short) - internet access service is defined by reference to art. 2, paragraph 4, lett. a of Regulation (EU) 2015/2120, which in turn defines it as «a publicly available electronic communications service that provides access to the internet, and thereby connectivity to virtually all end points of the internet, irrespective of the network technology and terminal equipment used».

It is within that concept of internet access service that we can specify what a universal service is. This is a service distinguished by two basic elements - one economic, the other technical - both stated in art. 84, paragraph 1 of the Code:

- On the economic side, it is a service offered «at an affordable price».
- On the technical side, it is an «adequate broadband internet access service»⁵.

It is up to Member States to guarantee that all consumers in their own territories can access universal service, as well as to specify both of its distinguishing criteria (art. 84, paragraphs 1 and 3, and art. 85 paragraph 2 Code).

³ The close link between market failure, SGEI, and universal service is underscored in W. SAUTER, *Services of General Economic Interest and Universal Service in EU Law*, in *European Law Review*, n. 2, 2008, pp. 15 ff.

⁴ In order for the state’s intervention to be consistent with fair competition, it must meet the criteria set out in the *Altmark* judgment (Case C-280/00, *Altmark Trans GmbH and Regierungspräsidium Magdeburg v Naberverkehrsgesellschaft Altmark GmbH* [2003] ECR I-7747) and in the so-called SGEI package issued by the European Commission. See W. SAUTER, *The Criterion of Advantage in State Aid: Altmark and Services of General Economic Interest*, in *TILEC Discussion*, paper n. 2014-015, *passim*.

⁵ Europe suffers from a digital lag in part owed to an inadequate digital literacy and awareness of European policymakers. Indeed, it was only with the 2018 Code that broadband Internet access service was qualified as a universal service. Previously, under art. 4 of the Universal Service Directive (Directive 2002/22/EC), access meant no more than the right to a «connection at a fixed location to a public communications network [...] capable of supporting [...] data communications at data rates that are sufficient to permit functional Internet access».

On the evolution the universal service has seen in electronic communications, see N. VAN EIJK, *Universal Service, a New Look at an Old Concept: Broadband Access as a Universal Service in Europe*, in *15th Biennial Conference van de International Telecommunication Society*, Berlijn, September 5–7, 2004, *passim*, available at [SSRN](#); A. G. GULATI, *Relevance of Retaining Notions of Universal Service in a Competitive Telecommunications Environment-Case of European Union*, 2012, *passim*, available at [SSRN](#); C. I. NAGY, *The Metamorphoses of Universal Service in the European Telecommunications and Energy Sector: A Trans-Sectoral Perspective*, in *German Law Journal*, n. 14, 2013, pp. 1737 ff.

More to the point, in specifying what counts as adequate broadband internet access, each Member State is to make an assessment «in light of national conditions and the minimum bandwidth enjoyed by the majority of consumers within the territory of that Member State, and taking into account the BEREC report on best practices» (art. 84, paragraph 3 Code).

It follows that the slower the bandwidth which consumers on average have access to within a Member State, the lower the adequacy threshold which the same Member State can set for universal service within its territory (and, conversely, the higher the bandwidth, the higher the threshold). Therefore, in Member States where bandwidth is slower to begin with, consumers will be less protected than in Member States that are digitally more advanced.

The Code does, to be sure, provide for a minimum threshold of adequacy, but that provision offers little help, stating that an «adequate broadband internet access service shall be capable of delivering the bandwidth necessary for supporting at least the minimum set of services set out in Annex V» (art. 84, paragraph 3). Indeed, considering that this is a minimum threshold, the set of services in question does not support bandwidth-hungry applications⁶.

National regulators are further entrusted with establishing whether retail prices for access to the internet are affordable for low-income consumers or for consumers with special social needs - such as «consumers living in rural or geographically isolated areas» - to this end taking account of national circumstances, and looking in particular at national price trends in the marketplace for internet access services (art. 85, paragraph 2, and whereas 219 Code). Whether prices are unaffordable, then, depends on normal market conditions, either on the consumer side (low-income consumers) or on the service-provider's side (reaching rural or geographically isolated areas).

If a Member State comes to a determination that a price is unaffordable, and so that a market failure has occurred, it will adopt whatever measures are needed to guarantee universal access for low-income consumers or for consumers with special social needs (art. 85, paragraph 2 Code), compensating service providers if the burden they are required to take on is found to be unfair (art. 90 Code)⁷.

⁶ The Annex V set comprises eleven services: (1) email; (2) search engines making it possible to find of all types of information; (3) online tools for basic training and education; (4) access to online news and news media; (5) buying or ordering goods or services online; (6) job search and job-searching tools; (7) professional networking; (8) internet banking; (9) eGovernment services; (10) social media and instant messaging; and (11) voice and video calls (standard quality).

⁷ For an overview of the kinds of financing provided to support universal service, see F. SARZANA DI S. IPPOLITO - F. MARINI BALESTRA, *Comunicazioni elettroniche europee*, Wolters Kluwer, Milano, 2019, p. 201; D. LYONS, *Narrowing the Digital Divide: A Better Broadband Universal Service Program*, in *UC Davis Law Review*, vol. 52, n. 2, 2019, *passim*; S.R. SCHMIDT - L.L. STANFORD - G. SCOTT, *Broadband for All: Policies for a Connected Society*, 2015, *passim*, available at [SSRN](#); J.P. PEHA, *A Market-Based Mechanism for Universal Service Obligations*, in *Telecommunications Policy Research Conference (TPRC)*, 1999, *passim*, available at [SSRN](#); A. BOIK, *The Economics of Universal Service: An Analysis of Entry Subsidies for High Speed Broadband*, in *NET Institute Working Paper No. 15-11*, *passim*, available at [SSRN](#).

2.3. The Digital Agenda for Europe

A further application of the principle of the social market economy can be found in the provisions of the Digital Agenda for Europe (DAE) that are designed to incentivize the spread of broadband networks. The DAE has set out the ambitious goal «to ensure that, by 2020, all Europeans have access to much higher internet speeds of above 30 Mbps and [...] 50% or more of European households subscribe to internet connections above 100 Mbps»⁸.

Because the market cannot reach this target on its own, the DAE has encouraged Member States to use «public financing in line with EU competition and state aid rules»⁹. And to help Member States in this task, the European Commission has issued a set of Broadband Guidelines that «summarise the principles of the Commission’s policy in applying the State aid rules of the Treaty to measures that support the deployment of broadband networks»¹⁰.

Key to these Broadband Guidelines is the distinction they make between broadband networks and next generation access (NGA) networks. The former are based on the existing fixed or wireless networks, including ADSL, ADSL2+ networks, non-enhanced cable (e.g., DOCSIS 2.0), 3G mobile networks (UMTS), and satellite systems. The latter, by contrast, rely wholly or partly on optical elements and are capable of delivering broadband access services with enhanced characteristics. NGA networks comprise fibre-based access networks (e.g., FTTB, FTTH, FTTC/VDSL), advanced upgraded cable networks (HFC/DOCSIS 3.0), and certain advanced wireless access networks¹¹.

The Broadband Guidelines further distinguish three kinds of geographic areas depending on how much internet coverage they have: white, grey, and black by order of increasing coverage.

If we combine the two distinctions - between networks and among geographic areas - we get a further distinction: between (a) areas (white, grey, or black) covered by broadband networks and (b) areas (white, grey, or black) covered by NGA networks.

⁸ A Digital Agenda for Europe, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 19.5.2010, COM(2010)245, par. 2.4.

The Digital Agenda objectives were further expanded with the 2016 measures for Connectivity for a European Gigabit Society, which include a broadband connectivity target of «universal connectivity offering a downlink of at least 100 Mbps, upgradable to Gigabit speed by 2025». The same objectives were also expanded under the previously mentioned “2030 Digital Compass,” stating that «by 2030 all European households will be covered by a Gigabit network, with all populated areas covered by 5G». See W. LEMSTRA, *Multiple Trajectories to Realize the Digital Agenda for Europe*, in 2014 TPRC Conference Paper, *passim*, available at [SSRN](#).

⁹ A Digital Agenda for Europe, par. 2.4, key action 8.

¹⁰ Communication from the Commission: EU Guidelines for the Application of State Aid Rules in relation to the Rapid Deployment of Broadband Networks (2013/C 25/01), par. 8.

¹¹ *Ibid.*, pars. 56 and 57.

(a) White areas are ones in which there is no provider of basic broadband services and none are expected to come within three years. In these areas there is a good chance that the European Commission will find state aid to be consistent with fair competition.

Grey areas are ones in which there is a single service provider, but it is unlikely that others will come within three years. Here the European Commission will have to carry out an assessment specific to the area before determining whether state aid is consistent with fair competition.

Black areas are ones in which at least two basic broadband service providers are available or will be available within three years. No market failure can be said to exist here, and so it is highly unlikely that any state intervention aimed at bringing in another basic broadband provider will be deemed consistent with fair competition. Still, this does not rule out the possibility of state intervention aimed at building out an NGA network in black areas that are only served by broadband.

(b) White NGA areas are ones not covered by any NGA network, and in which none are expected to come within three years. Here state aid aimed at building out an NGA network is likely to be deemed consistent with fair competition.

Grey NGA areas are ones in which there is a single NGA network or in which one is expected to be installed within three years, even if there are as yet no plans by any network operator to do so. Here the European Commission will carry out an in-depth analysis, greenlighting any state intervention only if deemed absolutely necessary in light of such an analysis.

Black NGA areas are ones in which at least two independently operated NGA networks are available or will be within three years. Here the European Commission is likely to come down against state intervention¹².

3. Broadband Coverage in Rural Areas

From a study the European Commission put out in 2020 titled “Broadband Coverage in Europe 2019”, two key findings emerge in regard to rural areas¹³. The first of these is that basic DSL broadband coverage is nearly ubiquitous¹⁴. The second relates to networks that deliver the kind of bandwidth needed to run bandwidth-hungry or delay-intolerant applications, and the finding is that these Next Generation Access

¹² *Ibid.*, pars. 61-77.

¹³ Under the definition offered by the Commission, «households in square kilometres with a population of less than one hundred are classified as rural». European Commission, “Broadband Coverage in Europe 2019: Mapping Progress towards the Coverage Objectives of the Digital Agenda” (Luxembourg: Publications Office of the European Union, 2020), p. 22.

¹⁴ As the Commission explains, «DSL (for Digital Subscriber Line) is the basic technology used to provide broadband over conventional telephone lines. The types of DSL used for standard fixed broadband (mainly ADSL or ADSL2+) deliver download speeds of at least 2 Mbps» (*ibid.*, p. 192).

(NGA)¹⁵ networks and Very High Capacity Networks (VHCN)¹⁶ either do not cover rural areas at all or do so only to a limited extent.

The more specific finding to emerge from the study is that «rural fixed coverage continued to be lower than national fixed coverage [...]. By mid-2019, rural fixed broadband coverage reached 89.7% of rural households compared to national coverage of 97.1%»¹⁷.

But it is another data point that more vividly brings out the digital divide between rural and urban areas: «DSL continued to be by far the most pervasive fixed broadband technology in terms of the number of rural homes passed, reaching 81.4% of rural EU households»¹⁸; «at the end of June 2019, the rural EU average for NGA coverage was 59.3%»¹⁹; «by mid-2019, 20.1% of rural EU homes were passed by either FTTP or DOCSIS 3.1 [VHCN] networks»²⁰.

According to the study, the impact of the digital divide between rural and urban areas is tempered by the fact that «other technologies can serve as a partial substitute for DSL in rural areas»²¹. For example, «in some countries, Fixed Wireless Access (FWA) services provide a significant boost to rural connectivity, especially in areas where deployment of other fixed technologies is challenging from both a technical and an economic standpoint»²². However, the study neglects to consider that since FWA relies on LTE technology, its users share network resources with mobile users and are furthermore, as a rule, subject to data caps.

4. The Technological Landscape: Internet Access via Satellite

Telecommunications essentially rely on two types of satellites: geostationary earth orbit (GEO) and low earth-orbiting (LEO) satellites. GEO satellites are put into orbit at an altitude of about 36,000 kilometres, enabling them to seamlessly synchronize with the earth's rotation, and because of the long distance the signal needs to travel back and forth between the satellite and the ground station, a signal propagation delay of 280 milliseconds results²³. LEO satellites orbit the earth at a much reduced altitude of a few

¹⁵ «Next Generation Access (NGA) coverage includes fixed-line broadband access technologies capable of achieving download speeds meeting the Digital Agenda objective of at least 30 Mbps coverage; combination of VDSL (including VDSL2 Vectoring), DOCSIS 3.0 (including DOCSIS 3.1), and FTTP» (*ibid.*, p. 17).

¹⁶ «Very High Capacity Network (VHCN) coverage includes fixed-line broadband access technologies primarily capable of achieving gigabit download speeds; combination of DOCSIS 3.1 and FTTP» (*ibid.*, p. 17).

¹⁷ *Ibid.*, p. 40.

¹⁸ *Ibid.*, p. 40. What also emerges from the study is that, «when compared to the total EU average DSL coverage, rural DSL coverage was 9.8 percentage points lower and the difference between total and rural DSL coverage remained considerable in some countries, such as [...] Sweden (23.7 percentage points)» (*ibid.*, p. 40).

¹⁹ *Ibid.*, p. 42.

²⁰ *Ibid.*, p. 45.

²¹ *Ibid.*, p. 41.

²² *Ibid.*, p. 41.

²³ J. F. KUROSE - K. W. ROSS, *Computer Networking: A Top-Down Approach*, 7th ed., Pearson Education, Hoboken, 2017, p. 20.

hundred kilometres, with drawbacks as well as advantages: on the downside, because they move rapidly (with an orbital period as short as 90 minutes), it takes a whole fleet of satellites to achieve a complete satellite system; on the upside, because the satellites travel so much closer to the earth's surface, the roundtrip delay is reduced to a few milliseconds²⁴.

But, on the whole, these characteristics make satellite telecommunications impracticable for internet access. Indeed, the use of the internet has changed profoundly over the years. Owing in part to the COVID-19 pandemic, we have witnessed a recent upsurge in applications requiring services markedly different from those required by traditional applications (email and web browsing). This new breed of applications is delay intolerant and/or bandwidth hungry, as with VoIP calling and video calling, video conferencing with numerous participants, online multiplayer games, live video streaming, 4K video, IPTV, and automated driving²⁵.

The long signal delay of GEO satellites makes them unsuitable for the current internet. But LEO satellites are a different matter²⁶. Emblematic in this regard is Iridium. At an orbital altitude of just 780 kilometres from the earth, «the proximity of Iridium's LEO network means pole-to-pole coverage, a shorter transmission path, stronger signals, lower latency, and shorter registration time than with GEO satellites»²⁷. However, «only» 66 Iridium satellites are in operation, and the internet service they provide only delivers «speed capabilities ranging from 22 to 1408 Kbps»²⁸. So, while this technology may meet the service needs of traditional online applications, it clearly cannot support the needs of current applications.

4.1. The Starlink Satellite Network

The birth of Starlink makes it necessary to rethink whether it is such a foregone conclusion that satellite telecommunications cannot support the kind of internet service needed to run current online applications. Starlink is a constellation of LEO satellites now being built by SpaceX, and already it can perform at speeds similar to those of an FTTC network²⁹.

²⁴ A. S. TANENBAUM - D. J. WETHERALL, *Computer Networks*, 5th ed., Pearson, Edinburgh, 2011, p. 114.

²⁵ It has been estimated, in this last regard, that «each autonomous vehicle will be generating approximately 4,000 GB—or 4 terabytes—of data a day,” and that “every autonomous car will generate the data equivalent of almost 3,000 people. Extrapolate this further and think about how many cars are on the road. Let's estimate just 1 million autonomous cars worldwide—that means automated driving will be representative of the data of 3 billion people». B. KRZANICH, *Data Is the New Oil in the Future of Automated Driving*, in *Intel Newsroom*, 2016, available at [Intel Newsroom](#).

²⁶ For more extensive technical information about LEO satellites, see S. YANG - H. LI - Z. LAI - J. LIU, *A Synergic Architecture for Content Distribution in Integrated Satellite and Terrestrial Networks*, in *2020 IEEE/CIC International Conference on Communications in China (ICCC)*, p. 97.

²⁷ Iridium Corporate Overview: Fact Sheet, available at [Iridium](#).

²⁸ *Ibid.*

²⁹ A. SAYIN - M. CHERNIAKOV - M. ANTONIOU, *Passive Radar Using Starlink Transmissions: A Theoretical Study*, in *The International Radar Symposium IRS 2019*, Ulm, June 26–28 2019, p. 1.



Starlink is being built in several stages. The first of these consists in putting into orbit no less than 4,425 satellites using two high-frequency bands: Ka (20/30 GHz) and Ku (11/14 GHz)³⁰. Starlink is reaching several EU Member States, which at the time are Austria, Belgium, Croatia, the Czech Republic, Denmark, France, Germany, Ireland, Italy³¹, the Netherlands, Poland, Portugal, and Sweden.

As SpaceX says, the company «is now delivering initial beta service both domestically and internationally, and will continue expansion to near global coverage of the populated world in 2021. During beta, users can expect to see data speeds vary from 50Mb/s to 150Mb/s and latency from 20ms to 40ms»³².

These speeds are bound to get even faster, and at a rapid clip, too. Indeed, one of Starlink's main features lies in its scalability, this thanks to the ability to put new satellites into orbit, install new ground stations, and update the software they run on, such that data speed and latency will improve significantly.

Scalability also makes the technology future-proof, meaning that it will be able to support not only the bandwidth-hungry, delay-intolerant applications previously mentioned but also, and especially, those that will be developed in the future, which we have every reason to expect will require even even higher-performing services.

But what I think is by far the most interesting characteristic about Starlink is its ability to provide broadband Internet access in «areas underserved or currently unserved by existing networks»³³.

To appreciate how important a service like Starlink is to rural areas, we need only consider the example of the Pikangikum First Nation, a small community of about two thousand people tucked away in a remote part of Northwestern Ontario, Canada - so remote, indeed, that the main way to get there is by airplane. The ability to access the internet through Starlink has in several ways made life much better for this community, enabling its members to improve their health care, education, and security and to more easily find work and carry it out³⁴.

5. Conclusions

Of all the services of general economic interest, internet access service is perhaps the one most exposed to market failure. It is difficult to see how government intervention can in such cases fix the problem, this for the simple reason that the law is specifically designed to guarantee a minimal set of barebones

³⁰ Federal Communications Commission, “FCC Authorizes SpaceX to Provide Broadband Service Via Satellite Constellation,” in *FCC news release*, March 29, 2018, available at [FCC](#).

³¹ Some early adopters in Italy have been testing out Starlink, and the results look encouraging, with download speeds of about 150 Mbps and upload speeds of about 30 Mbps. Two of these tests can be viewed at [YouTube](#) and [YouTube](#).

³² SpaceX, available at [Starlink](#).

³³ Federal Communications Commission, “Space Exploration Holdings, LLC, Application for Approval for Orbital Deployment and Operating Authority for the SpaceX NGSO Satellite System, Memorandum Opinion FCC 18-38”, adopted March 28, 2018, released March 29, 2018, p. 2, available at [FCC](#).

³⁴ The touching story of this community is captured in a SpaceX video available at [YouTube](#).

services, good enough for basic survival in a digital environment, but incapable of supporting bandwidth-hungry and delay-intolerant applications whose use is now essential to citizenship in the EU and to a good chunk of life's nondiscretionary activities.

Especially for those who live in rural or remote areas, then, the right to universal service cannot support a meaningful participation in public and social life. Equally inadequate in bridging the rural-urban divide is the public funding provided for under the DAE. The picture painted by the European Commission's "Broadband Coverage in Europe 2019" report in what concerns rural areas is disappointing: while basic broadband internet is generally available, networks capable of supporting bandwidth-hungry and delay-intolerant applications are not, their coverage being either inexistent or inadequate.

What seems to be looming on the horizon, then, when it comes to broadband internet access in rural areas, is the singular prospect of a twofold failure: a market failure coupled with a public sector failure. But it is well appreciated that things change rapidly in the world of electronic telecommunications, and so if this conclusion may have been accurate even only a few months ago, it is no longer accurate today. And the reason for it, I submit, is the technological revolution introduced by Starlink. Thanks to this constellation of satellites in constant and rapid development, the scenario we should be able to look to in a not too distant future is one in which we are no longer speaking of market failure but, on the contrary, of a market triumph - and one that, most importantly, will put an end to the digital divide by which millions of people in Europe are affected³⁵.

³⁵All technological innovations have downsides, and Starlink is no exception to this rule. Light pollution and space debris are the main ones. See R.J. RYAN, *The Fault in Our Stars: Challenging the FCC's Treatment of Commercial Satellites as Categorically Excluded from Review Under the National Environmental Policy Act*, in *Vanderbilt Journal of Entertainment & Technology Law*, vol. 22, n. 4, 2020, p. 949: «mega satellite constellations, such as SpaceX's Starlink, have the ability to connect humans anywhere on the globe with each other in a way never before possible. To accomplish this feat, however, requires the unprecedented deployment of tens of thousands of satellites into orbit around Earth. With this comes the risk of altering the night sky for astronomers and the public for decades to come, as well as the risk of polluting the environment through the use of toxic satellite components»; T. PULTAROVA, *SpaceX Starlink satellites responsible for over half of close encounters in orbit, scientist says*, available at space.com: «operators of satellite constellations are constantly forced to move their satellites because of encounters with other spacecraft and pieces of space junk. And, thanks to SpaceX's Starlink satellites, the number of such dangerous approaches will continue to grow, according to estimates based on available data».