



**Australian Government**

**Department of Infrastructure, Transport,  
Regional Development and Communications**

# **Submission to the Joint Standing Committee on the National Capital and External Territories**

Availability and access to enabling  
communications infrastructure in Australia's  
external territories

January 2021



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# Introduction

The Department of Infrastructure, Transport, Regional Development and Communications (the Department) welcomes the opportunity to make a submission to the Joint Standing Committee on the National Capital and External Territories (the Committee) inquiry into availability of and access to enabling communications infrastructure in Australia's external territories.

The Department is responsible for administering many of Australia's external territories, including the Indian Ocean Territories (the Territory of Christmas Island and the Territory of Cocos (Keeling) Islands), Norfolk Island, the Territory of Ashmore and Cartier Islands, and the Coral Sea Islands Territory. The Department is also responsible for administering policy and programs relating to Australia's postal and telecommunications sector including broadband policy and programs, and spectrum policy management.

This submission primarily addresses communications infrastructure in the Indian Ocean Territories and on Norfolk Island, where there are sizable permanent settlements, residents and businesses which are reliant on communications infrastructure to maintain contact, learn and transact with the Australian mainland.

This submission provides an overview of:

- the regulatory framework for communications applying in the territories;
- existing communications technologies and infrastructure in Australia's Indian Ocean Territories, and on Norfolk Island and Willis Island;
- future opportunities in communications technologies and infrastructure, the development of which is being monitored by the Department;
- barriers relating to communications infrastructure in Australia's external territories; and
- opportunities and benefits arising from communications infrastructure in Australia's external territories.

# Communications in Australia

Communications services play an important and expanding role in how people in the community go about their daily lives and how businesses operate. The Australian Government is committed to Australians having ready access to high-quality, reliable and affordable communications services.

Digital connectivity is a key enabler of Australia’s social and economic activity. The mobile and fixed telecommunications networks that provide this connectivity are critical to our lives. Mobile services have long outnumbered fixed services, although fixed services carry greater volumes of data. In June 2019, there were 7.82 million fixed-line phone services in operation and approximately 16.4 million Australians had a smartphone.<sup>1</sup>

Postal communication services also play an increasingly key role in Australian life, as the growth of e-commerce continues and consumer preferences change. December 2020 was Australia Post’s busiest month in history with deliveries almost 20% higher than the previous December, and airfreight tonnage up 76%. This followed Australia Post experiencing record domestic parcel volume growth since the start of COVID-19 (see Table 1).

**Table 1. Year-on-year domestic parcel volume growth**

	April 2020	May 2020	June 2020	July 2020	August 2020	September 2020	October 2020	November 2020
<b>National Australia Post</b>	64%	49%	51%	54%	47%	59%	55%	43%
<b>National StarTrack</b>	3%	-1%	27%	14%	9%	24%	10%	18%

Broadcasting services play an important role in reflecting the diversity of Australian culture. Access to diverse sources of high-quality information and public interest journalism is integral to the health and functioning of Australia’s democratic systems. A strong, independent media sector, capable of producing trusted public interest journalism, is also an important countermeasure to the increasing proliferation of disinformation.

The Australian media sector is a significant segment of the domestic economy, employing approximately 90,000 Australians in 2018–19.<sup>2</sup> It generated an estimated \$47.7 billion of domestic revenue through advertising and consumer spend in 2019.<sup>3</sup> The entertainment and media sector also provides a platform for other sectors of the economy to advertise, which has a significant flow-on effect for the broader economy.

<sup>1</sup> Australian Communications and Media Authority (ACMA), [Australian Communications and Media Authority Communications Report 2018-19](#), Australian Government, 2020, p. 5, accessed 22 January 2021.

<sup>2</sup> Australian Bureau of Statistics, 2018–19, *Australian Industry*, cat. no. 8155.0.

<sup>3</sup> PwC (2020), *Global Entertainment and Media Outlook 2020-24*. This figure includes revenue generated in Australia by internationally owned entities, and does not include revenue generated by Australian entities overseas.

# Legal frameworks

Section 51(v) of the Australian Constitution enables the Commonwealth to make laws for “postal, telegraphic, telephonic, and other like services”. This legislative power supports the postal, telecommunications and broadcasting frameworks.

## Postal framework

Australia has a competitive market for the carriage of parcels, with numerous large and small providers. Australia Post has a legislated monopoly on the delivery of most letters in Australia (‘reserved letter service’), and under Universal Postal Union (UPU) arrangements, Australia Post is obliged to carry international inbound letters and parcels. Australia Post began postal operations on Norfolk Island on 1 July 2016 under the *Norfolk Island Legislation Amendment Act 2015* (Cth).

The *Australian Postal Corporation Act 1989* (Cth) (Australia Post Act) and its subordinate regulations and instruments establish Australia Post as a statutory corporation and impose Community Service Obligations (CSO) and requirements regarding the handling of mail, amongst other things. The Australia Post Act also gives effect to the current Acts of the UPU as ratified by Australia.

The Public Governance, Performance and Accountability Rule 2014 prescribes Australia Post as a Government Business Enterprise, meaning it is governed by the *Public Governance, Performance and Accountability Act 2013* (Cth). The more complete legal framework is shown in Figure 1.<sup>4</sup>

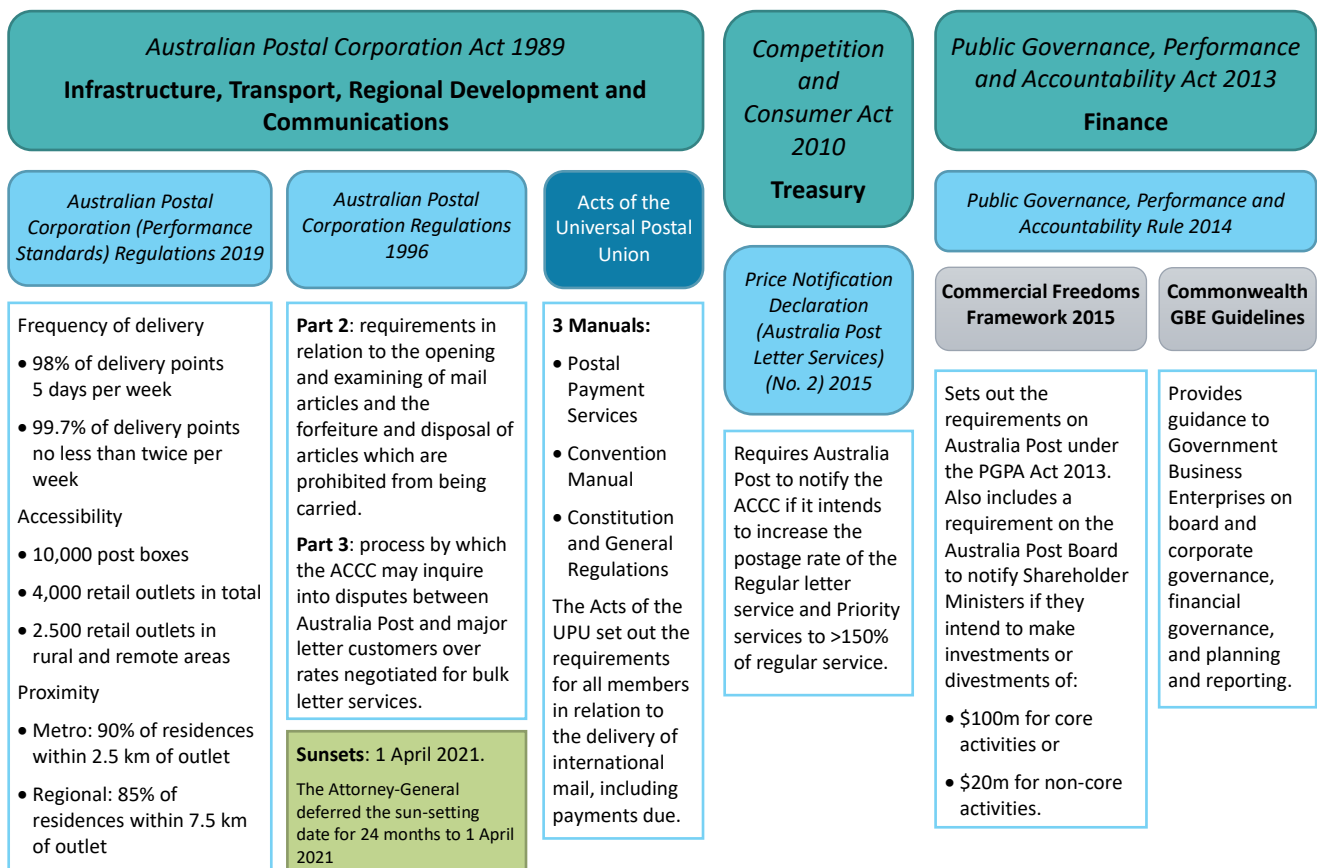
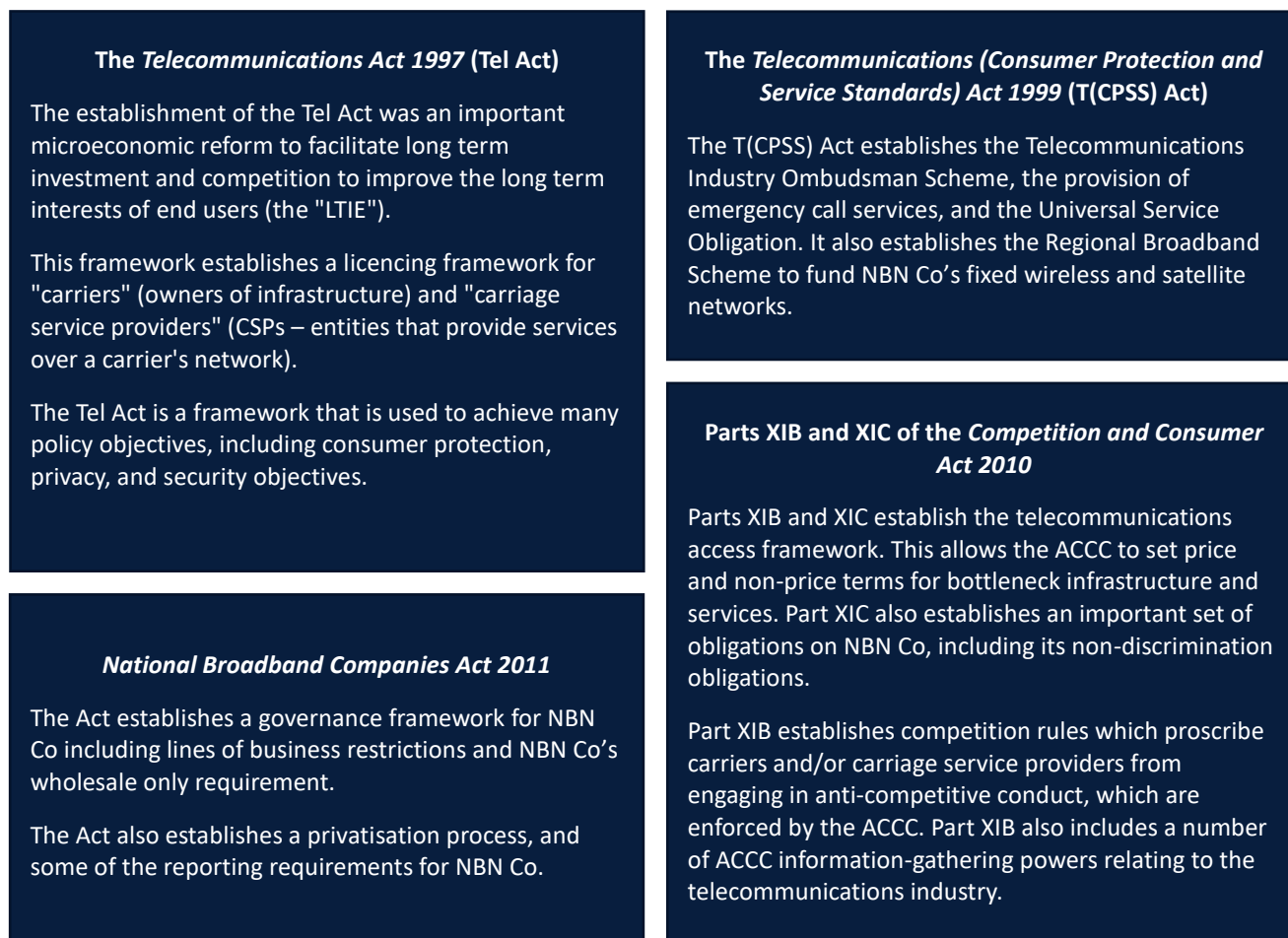


Figure 1. Postal legal framework

<sup>4</sup> The Temporary Regulatory Relief for the Performance Standards Regulation does not apply to Australia’s external territories.

## Telecommunications framework

Australia has an open and competitive telecommunications market, and the provision of infrastructure and services takes place within overarching legislative framework focused on promoting market competition and providing for consumer safeguards and national interest matters. The framework is primarily established by the *Telecommunications Act 1997* (Cth) (the Tel Act) and the *Telecommunications (Consumer Protection and Service Standards) Act 1999* (Cth) (the TCPSS Act), Parts XIB and XIC of the *Competition and Consumer Act 2010* (Cth) (the CCA Act) and subordinate regulation and instruments. Figure 2 shows the telecommunications legal framework.



**Figure 2. Telecommunications legal framework**

The Commonwealth legal framework applies to Christmas Island and the Cocos (Keeling) Islands and can be extended to other external territories as prescribed under s10 of the Tel Act. The framework does not currently apply to Norfolk Island, which has its own telecommunications statute in place (see below).

### Application to Norfolk Island

The Commonwealth's telecommunications framework was not extended to Norfolk Island upon enactment or as part of 2015 Norfolk Island reform measures due to the complexities associated with applying the national framework and associated regulatory requirements to Norfolk Island's operational arrangements, which have evolved separately for several decades.



Commonwealth legislation that does not currently apply to Norfolk Island includes the Tel Act, the TCPSS Act and Parts XIB and XIC of the CCA Act. Instead, the *Telecommunications Act 1992* (NI) sets out provisions concerning ownership, land access, tariffs, customer equipment and interception.

Because Norfolk Telecom operates under its own telecommunications regime, it operates under its own telephone numbering arrangements. Mainland based carriers apply additional charges for calls to Norfolk Island, and apply roaming charges for customers using their mainland based service on the island.

Extending the Commonwealth's telecommunications framework to Norfolk Island remains Government policy. While efforts are being made to address this situation, extension of the framework requires careful consideration to ensure there are no unintended consequences, particularly for service delivery and consumers on Norfolk Island.

## Broadcasting framework

The *Broadcasting Services Act 1992* (Cth) (the BSA) is the primary piece of legislation that sets the rules and regulations for the broadcasting and media industry in Australia. The BSA currently applies to all external territories except Norfolk Island.<sup>5</sup> Television and radio services on Norfolk Island are currently regulated by the *Norfolk Island Broadcasting Act 2001* (Cth) (the NIBA), which contains explicit provisions excluding the Norfolk Island Government Radio Station VL2NI service from being covered by the BSA.<sup>6</sup> From 17 June 2021, the BSA will also apply to Norfolk Island.<sup>7</sup> The NIBA will then be repealed so that there will not be dual broadcasting frameworks in place.

Part 2 of the BSA sets out the categories of broadcasting services to which the BSA relates, including national television and radio services, commercial television and radio broadcasting services, community television and radio services, open narrowcasting television and radio services and subscription television services.

The Australian Communications and Media Authority (ACMA) – an independent Commonwealth statutory authority – is responsible for overseeing and regulating these services. As part of its role, ACMA has a range of functions and powers that are to be used in a manner that will produce regulatory arrangements that are stable and predictable and deal effectively with breaches of the rules established in the BSA. The BSA does not regulate all media services. For example, print media is predominantly self-regulated and only a limited number of provisions in the BSA apply to newspapers. Oversight falls to independent industry bodies, such as the Australian Press Council.

Though the national broadcasting services (the ABC and SBS) are a category of broadcasting service under the BSA, ACMA only has a limited role as regulator. In the case of the ABC and SBS, their national broadcasting services are provided in accordance with the *Australian Broadcasting Corporation Act 1983* (Cth) and the *Special Broadcasting Services Act 1991* (Cth) respectively.

While the BSA covers online services, digital-native media services, including online-only news publishers and internet streaming services, are not captured by current media regulation in Australia. For example, live internet streaming services (including television, radio, and social media video streaming services) are currently excluded from the BSA definition of a 'broadcasting service' and are not currently subject to the regulatory provisions in the BSA including media ownership rules, content regulation and quotas, and licensing requirements. However, in response to the Australian Competition and Consumer Commission's Digital Platforms Inquiry, the Government committed to a program of work and series of reforms to address this. To date, the News Media and Digital Platforms Bargaining Code has been introduced into the Parliament, and a Media Reform Green Paper has been released.

Broadcasting spectrum management and transmission is regulated under the *Radiocommunications Act 1992* (Cth). This Act extends to all the external territories and, unlike the BSA, already covers Norfolk Island's existing radio and television spectrum channel allocations and transmitters.<sup>8</sup>

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<sup>5</sup> See s10 and s10AA of the BSA.

<sup>6</sup> See s4 and s5 of the NIBA.

<sup>7</sup> See Schedule 4 of the *Territories Legislation Amendment Act 2020* (Cth).

<sup>8</sup> *Radiocommunications Act 1992* (Cth) s15.

# Availability of and access to communications technologies and infrastructure

Being geographically isolated from mainland Australia,<sup>9</sup> fast and reliable communications services keep the external territory communities connected and are essential for education, business, tourism and other economic initiatives, and in emergency situations.

## Postal communications services

Australia Post provides postal services to the Indian Ocean Territories and Norfolk Island. Almost all airmail is carried by passenger planes. With domestic and international airfreight routes significantly disrupted due to COVID-19, Australia Post's ability to move large volumes of letters and parcels quickly and cost effectively has been impacted. This, combined with the external territories' remote maritime nature, has meant that some residents have experienced service delays during the pandemic. This unprecedented challenge is in addition to existing challenges; for example, shipping schedules to Norfolk Island are heavily dependent on maritime weather conditions and can result in service delays.

Post Offices located on the islands offer a range of parcel, passport, financial, insurance, identity and document services to residents. Christmas Island is served by one Licensed Post Office (LPO) and an additional Red Street Posting Box. The Cocos (Keeling) Islands are served by two LPOs, one on Home Island and one with slightly fewer service offerings on West Island. Additionally, they are served by two Red Street Posting Boxes, both located on Home Island. Norfolk Island is served by one LPO and four Red Street Posting Boxes. Australia Post began their postal operations on the Island on 1 July 2016 under the *Norfolk Island Legislation Amendment Act 2015* (Cth). Letters and parcels are transported on flights departing from Brisbane and Sydney, and shipping services running from Sydney and New Zealand. On 20 July 2020, a new mail processing facility (that also accommodates Australian Border Force operations) opened on Norfolk Island.

## Telecommunications services

Communications infrastructure in Australia is funded through commercial and government investment, or a combination of both. Communications infrastructure providers' investment decisions are generally determined by commercial returns.

There are numerous communications providers (both wholesale and retail service providers) operating across Australia. Providers may choose to operate in particular markets or locations, while others provide services on a national scale. In less populous areas, competing regional and global satellite systems can provide additional options to terrestrial communications platforms.

It is not commercially or economically viable to provide ubiquitous communications, such as mobile coverage or optical fibre connections, across the whole of Australia due to its size and the geographically-dispersed population. However the Universal Service Guarantee (USG) arrangements provide for access to baseline voice and broadband services, using appropriate technologies where the USG applies (see below). Because revenues from small remote communities may not meet the costs of service provision, these services typically requires subsidisation from the wider customer base so prices are generally affordable. This is achieved by the universal service obligation and Regional Broadband Scheme (RBS) mechanisms supporting the USG. In the case of mobile services, there is a large degree of commercial cross-subsidisation from large national customer bases enabling geographically uniform pricing, noting the services are mobile by nature and not location specific.

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<sup>9</sup> Christmas Island is located 2,605 kilometres north-west of Perth and 490 kilometres south-west of Jakarta. The Cocos (Keeling) Islands are located 2,750 kilometres north-west of Perth and 900 kilometres west of Christmas Island. Norfolk Island is located in the Pacific Ocean, 1,676 kilometres north-east of Sydney.

**Table 2. Comparison of telecommunications services in Australia**

	Mainland (city)	Cocos (Keeling) Islands	Christmas Island	Norfolk Island	Mainland (rural)	Mainland (remote)
<b>Mobile</b>	4G→5G	2G→4G	2G→4G?	2G→4G	3G/4G→4G	3G/4G→4G
	Satphones	Satphones	Satphones	Satphones	Satphones	Satphones
<b>Broadband</b>	FTTN/FTTC/FTTP/ FTTB/HFC Fixed Wireless	Satellite	Satellite and FTTP	Satellite and ADSL	FTTN/FTTC (regional centres), Fixed Wireless, Satellite and some ADSL	Satellite and little ADSL
<b>Fixed voice</b>	Telstra USO, multiple voice competitors	Telstra USO	Telstra USO	Norfolk Telecom	Telstra USO, limited voice competitors	Telstra USO, limited voice competitors
<b>Payphones</b>	~15,000 nationally	2	4	Nil	~15,000 nationally	
<b>Population</b>	18,320,373 <sup>10</sup>	544 <sup>11</sup>	1,843 <sup>12</sup>	1,748 <sup>13</sup>	7,045,198 <sup>14</sup>	
<b>Premises</b>		166	566	1,080		
<b>Area</b>		13.1 km <sup>2</sup>	135 km <sup>2</sup>	34.6 km <sup>2</sup>		

The Government recognises the importance of communications for all Australians, regardless of location, and has implemented regulatory and funding measures to address disparities in the availability and accessibility of communications.

The Government's funding programs seek to complement private sector commercial investment to maximise economic and social opportunities in regional, rural and remote Australia, including the external territories, by leveraging public, private and community investment in communications infrastructure. Programs include the:

- *Building Better Regions Fund*, which has provided funding towards improving communications infrastructure on Norfolk Island and the Cocos (Keeling) Islands.
  - Norfolk Island Regional Council received \$3.45 million through Round 2 of the Infrastructure Projects stream for the futureproofing telecommunications in Norfolk Island project. The project installed a 4G mobile network on Norfolk Island to replace the obsolete and failing 2G network.
  - Christmas Island Domain Administration Limited received \$628,000 through Round 2 of the Infrastructure Projects stream for the Cocos (Keeling) Islands Mobile Telephony Replacement Project to replace the existing near obsolete 2G network with a reliable 4G Long-Term Evolution (LTE) network.
- *Mobile Black Spot Program*. While the external territories are in scope for the Program, no projects have been funded in these areas to date.
- *Regional Connectivity Program*, noting that funding applications closed on 17 November 2020 and successful applications are yet to be announced.

<sup>10</sup> As at 30 June 2019. See data cube in ABS, [Regional population](#), ABS, 25 March 2020, accessed 22 January 2021.

<sup>11</sup> As at 2016. See [2016 Census QuickStats - Cocos \(Keeling\) Islands](#), ABS, 23 October 2017, accessed 22 January 2021.

<sup>12</sup> As at 2016. See [2016 Census QuickStats - Christmas Island](#), ABS, 23 October 2017, accessed 22 January 2021.

<sup>13</sup> As at 2016. See [2016 Census QuickStats - Norfolk Island](#), ABS, 23 October 2017, accessed 22 January 2021.

<sup>14</sup> As at 30 June 2019. See data cube in ABS, [Regional population](#), ABS, 25 March 2020, accessed 22 January 2021. Includes Inner regional, outer regional, remote Australia and very remote Australia.

- The deployment of the *National Broadband Network* that provides superfast broadband services to more than 11.7 million premises across the country, including in the external territories.

## Universal Service Guarantee and Regional Broadband Scheme

The provision of access to basic telecommunications services in Australia is covered by the Australian Government's USG. The USG covers reasonable access to the standard telephone service, payphones and wholesale broadband services operating with peak speeds of at least 25 megabits per second (Mbps) download and 5 Mbps upload. The USG is underpinned by provisions in the TCPSS Act and Tel Act in those external territories in which the Acts apply. The USG does not cover access to mobile services, but it does not preclude the use of mobile infrastructure to deliver new USG services.

Telstra is currently responsible for delivering the telephone and payphone components of the USG under the historical universal service obligation (USO), which is set out in the TCPSS Act and an associated contract between Telstra and the Commonwealth. Telstra receives significant Commonwealth funding to support the delivery of these services. To the best of our knowledge Telstra has never had a universal service role on Norfolk Island and the provision of service on Norfolk Island is not part of its current responsibilities.

NBN Co Limited (NBN Co) is generally responsible for delivering the broadband component of the USG under new statutory infrastructure provider (SIP) laws in Part 19 of the Tel Act, although other SIPs can be designated for particular areas. The SIP laws came into effect on 1 July 2020. While SIPs can offer a range of wholesale services, they must at least offer a standard wholesale service to retailers with peak speeds of at least 25 Mbps download and 5 Mbps upload. On fixed-line and fixed wireless networks, SIP wholesale services are also required to support retail voice services. NBN Co's provision of fixed wireless and satellite services, which are loss-making, is supported by the new RBS.

The Government has established the RBS to ensure transparent and sustainable funding for essential broadband services to regional, rural and remote Australians. The NBN provides significant economic and social benefits in regional communities. The investment in the network has boosted productivity, employment and innovation, and enables regional Australians to fully participate in the digital age. However, providing quality broadband services to regional Australia is very expensive. Modelling by the Bureau of Communications and Arts Research in its 2016 report on NBN Co's non-commercial services estimated that the company's fixed-wireless and satellite networks will incur a net present loss of around \$9.8 billion over 30 years. These figures were updated by the ACCC in 2020 and net losses are now estimated at \$12.949 billion between 1 July 2009 and 30 June 2040 in net present terms. The RBS that commenced on 1 January 2021 will make these existing costs transparent and spread them across all NBN-comparable networks, with NBN Co continuing to pay around 95% of the cost.

Consistent with the application of the telecommunications regime generally to external territories, the legislative components of the USG – the USO and SIP laws – apply to Christmas Island and the Cocos (Keeling) Islands but not to other the external territories, including Norfolk Island, unless prescribed by regulations.

While NBN Co is not currently required to service Norfolk Island as a SIP because these provision do not apply to Norfolk Island, NBN Co does provide Sky Muster satellite services on the Island as it has long been part of its network design and operational planning. NBN Co also provides Sky Muster satellite services on Christmas Island and the Cocos (Keeling) Islands, where the SIP laws do apply.

If Commonwealth telecommunications law was extended in full to Norfolk Island, the legislative elements of the USG would also apply. In the case of the telephone and phone component, a provider would need to be designated. In the case of broadband, NBN Co is the default SIP nationally, but there is scope to designate other SIPs capable of supplying the necessary baseline services.

There has been a long standing interest in whether the voice component of the USG can be better delivered nationally, particularly given greater use of mobile services for voice calls and the emergence of new technologies. The \$2 million Alternative Voice Services Trials (AVST) Program is providing grants to identify and trial new ways to deliver voice services.

Concerotel has been awarded a grant under the program. Concerotel will deliver up to 200 trial voice services in the Cocos (Keeling) Islands and on Norfolk Island, providing better VOIP services to mobile phones reliant on satellite backhaul links. Concerotel will work with the Indian Ocean Territories Telecom and Norfolk Island Data Services to deliver the trial services.

## National Broadband Network and Sky Muster satellite broadband

NBN Co has rolled out the National Broadband Network (NBN) using the technology best matched to each area of Australia. This includes the use of fixed wireless and satellite connections to provide services in locations that are technically and financially challenging to serve due to low population densities and the topography of the area. Due to these factors, satellite services were selected for Christmas Island, the Cocos (Keeling) Islands and Norfolk Island.

NBN Co's Sky Muster satellite service began offering services on 29 April 2016, providing access to the NBN for over 400,000 homes and businesses across regional and rural Australia.

While most satellites carry a mix of services, NBN Co's satellites are optimised for broadband. The NBN Co satellite service provides peak wholesale speeds of 25 Mbps download and 5 Mbps upload, which is much faster than any satellite service previously available.

NBN Co's Sky Muster satellite broadband service offers two wholesale speeds tiers, 12/1 Mbps or 25/5 Mbps, under a range of plans across the network's 101 satellite beams. The Sky Muster Plus product also enables wholesale download speeds to burst above 25 Mbps when network capacity is available. As with all broadband services, actual speeds vary at different times due to a range of factors such as the type and quantity of applications in use and the number of users engaged on the satellite beam.

NBN's satellite network installation has a fixed capacity and is designed to reliably service the end-users located within each beam. Satellite installations do not require frequent upgrading, however, since launch of the service four years ago NBN Co has continually improved its products so they better meet the needs of households and businesses on Sky Muster services.

NBN Co launched its Sky Muster Plus product in August 2019 to better meet the needs of satellite customers. The new product reduced the number of applications that were counted towards the monthly data download limit and does not shape essential services once a customer exceeds their monthly data usage. Download speeds can exceed 25 Mbps when the network is able to facilitate it. This resulted in an initial increase of around 30% extra data available to end-users on this product.

NBN Co upgraded the Sky Muster Plus product in March 2020. With this upgrade, almost all applications are unmetered, with the exception of video streaming and Virtual Private Networks. The new iteration of the product introduced an entry level plan providing 25 gigabyte (GB) peak/25 GB off-peak data (totalling 50 GB allowance per month), selling to broadband retailers at \$35. The pre-existing 50 GB+, 100 GB+ and 150 GB+ plans remained. NBN Co also introduced new methods of packaging plans using Data Blocks. Data Blocks are 5 GB increments that can boost monthly metered data allowances by 5 GB peak and 5 GB off-peak for \$4 per Data Block (wholesale). NBN Co also introduced Top-Ups as part of the upgraded Sky Muster Plus product. The Top-Up option allows customers to access additional metered data on an ad-hoc basis. Top-Ups are available in increments at \$3 for 1 GB peak/1 GB off-peak. The maximum data allowance is effectively 320 GB a month plus unmetered content, which is significantly greater than the 2017 data cap which was a maximum of 150 GB per user in total.

As a result of the changes to the Sky Muster Plus product, around 70% of all data is now unmetered for Sky Muster Plus users.

In October 2019, NBN Co launched the Business Satellite Service (BSS) to provide business-grade broadband services to businesses and regional enterprises within some satellite service areas. At present the BSS has been rolled out to areas covered by beams with sufficient demand and remaining capacity within the beam. BSS services are available on the Cocos (Keeling) Islands but are not currently available on Christmas Island or Norfolk Island.

## Broadcasting services

Radio and television broadcasting services are also essential for residents of Australia's external territories to stay connected. These services deliver emergency broadcasting as well as Australian and international news, music and cultural programming.

## Viewer Access Satellite Television

The Indian Ocean Territories and Norfolk Island have access to the Viewer Access Satellite Television (VAST) service which provides free-to-air digital television for areas of Australia where terrestrial television transmission is not available. A range of channels are available on VAST including commercial free-to-air television channels and ABC and SBS television and radio channels. The television and radio service provided is comparable to other remote Australian communities.

## Christmas Island infrastructure and services

### Satellite services

NBN Co's Sky Muster satellites serve Christmas Island. As of December 2020, there were 510 premises on Christmas Island with an active NBN Sky Muster service. Across the 2020 calendar year 21 service faults were recorded.

NBN Co's BSS services are not currently available on Christmas Island.

A second satellite internet service is delivered by a private provider, Speedcast.

### Fixed-line infrastructure and services

In 2018, Christmas Island was connected to the Australia-Singapore Cable, owned by Vocus Communications. The 4,600 km cable connects to Christmas Island over a 30 km spur from the main cable. The cable infrastructure has improved access to internet services on Christmas Island and provides bandwidth of 40 terabits per second. The broadband service provided by cable is relatively reliable, as it is not impacted by weather interference. The undersea cable opens new commercial opportunities, such as online service delivery, website design, and accounting and consultancy services. It also supports the delivery of services requiring greater bandwidth and lower latency, such as telehealth services facilitated via video conferencing, and greater access to online resources for students.

To acknowledge the higher cost of establishing an undersea cable route compared to a terrestrial route, the ACCC has established a regulated backhaul price for traffic on the spur that is 470% on the Domestic Transmission Capacity Service Final Access Determination price for a service provided over a regional route of 2,600 km at the required data rate.<sup>15</sup>

The Australian Government is funding the connection of fibre between the cable and key assets. Vocus Communications has made arrangements for retail services with a commercial provider, Christmas Island Fibre Internet (CiFi) which began delivering broadband services to the community in July 2020.

As of 10 November 2020, there are more than 100 customers connected to CiFi's residential plans, with more waiting to connect once the coverage zone becomes available. As at 10 November 2020, about 30% of the township is covered. These areas are mainly the western side of Settlement from Rocky Point onwards through into Kampong and Flying Fish Cove. CiFi is in the process of installing Nokia equipment and antennas to expand this coverage. The Department is working with CiFi on building and land access to increase the current level of coverage.

Vocus is also providing a free high-capacity Wi-Fi hotspot in Flying Fish Cove and at the airport; CiFi is managing these services. Wi-Fi services are available at the Christmas Island Visitor Centre and many hotels have Wi-Fi services available for their guests.

Initial feedback from the CiFi rollout has been positive, with user experience reportedly improving dramatically, particularly when downloading large files.

<sup>15</sup> Vocus, [Submission to the DTCS FAD consultation paper](#), Vocus, n.d., accessed 22 January 2021.

Australian Government support towards undersea cable infrastructure in cooperation with trusted providers is also in line with our position that telecommunications networks should be designed and deployed in a way that is secure, resilient, in keeping with international, open, consensus-based standards and risk-informed cybersecurity best practices.

## Mobile network

Christmas Island has a 2G mobile network operated by Telstra, which is limited to residential areas. Mobile phones need 2G capability and require a Telstra SIM card to operate. The network only accommodates voice calls and SMS, there is no mobile data available.

Due to the remote location, unique topography and vegetation on Christmas Island, the mobile network's coverage does not extend to Christmas Island National Park. The Park constitutes two-thirds of the total Christmas Island landmass and is a major tourist attraction. The lack of mobile reception in the Christmas Island National Park presents navigation challenges for tourists wishing to access the park, and also raises safety issues in emergency situations. There are practical problem with deploying infrastructure in national parks – deployment of infrastructure can unavoidably impact the visual amenity of an area and disrupt sensitive habitats. As a result, two-way radios are often used to communicate in areas out of the mobile reception footprint and visitors to the Christmas Island National Park are encouraged to carry a personal locator beacon (PLB).

## Emergency calls

Emergency Calls to Triple Zero (000) and 112 on Christmas Island are handled in the same way as calls on the Australian mainland (they are routed to Telstra to be answered in Telstra's role as Emergency Call Person, and then transferred to the relevant Emergency Service Organisation (Police, Fire or Ambulance) for emergency response. In addition, if there is a failure in the Island's telecommunication link to the Australian mainland, the Emergency Call Person (Telstra) has built diversions on the Island network as a failover mechanism so that the Triple Zero calls are answered by the Australian Federal Police on the Island.

## Broadcasting services

The Indian Ocean Territories Administration oversees digital and radio communications infrastructure, including emergency communication infrastructure.

Through the VAST signal, the Christmas Island community has access to ABC and SBS television and radio services as well as a selection of commercial free-to-air channels, with services provided by WIN and Prime drawing on programming from the 7, 9 and 10 networks. A local community radio station, 6RCI, is available on Christmas Island and transmits from 105.3 FM at Rocking Point and 102.1 FM at Drumsite. Christmas Island residents also receive Red FM commercial radio from Western Australia on 98.9 FM and 106.9 FM and ABC National Radio (on 97.3 FM) and Triple J (100.5 FM).

## Cocos (Keeling) Islands infrastructure and services

### Satellite services

NBN Co's Sky Muster satellites serve the Cocos (Keeling) Islands. As of December 2020, there were 221 premises on the Cocos (Keeling) Islands with an active NBN service. Across the 2020 calendar year 31 service faults were recorded.

NBN Co's BSS is available to businesses and enterprises on the Cocos (Keeling) Islands.

### Fixed-line infrastructure and services

The Cocos (Keeling) Islands are not connected to any fixed-line backhaul infrastructure: there is currently no live submarine cable connection. The community relies on satellite services.

## Mobile network

The Christmas Island Domain Administration Limited received a \$628,000 grant from the Building Better Regions Fund for the Cocos (Keeling) Islands Mobile Telephony Replacement Project. The project replaces the existing 2G network in specific areas of the Cocos (Keeling) Islands with a 4G LTE network. The project completion was delayed due to the impacts of the COVID-19 pandemic but completion is expected in the first quarter of 2021.

Indian Ocean Territories Telecom Pty Ltd (IOTT) is the only network provider that delivers mobile-type services to the Cocos (Keeling) Islands. IOTT provides access to 4G LTE network coverage for the majority of the main atoll and lagoon, including the cross-lagoon ferry routes. Cocos (Keeling) Island residents and visitors can purchase a 4G SIM card or a 4G LTE Wi-Fi router to access the network. Visitors and residents can then access Wi-Fi calling through mobile or desktop applications such as Skype and WhatsApp.

## Emergency communications

The Emergency Call Service for Triple Zero (000) and 112 does not currently operate on the Cocos (Keeling) Islands. The Cocos (Keeling) Islands have island-based Police Emergency Services call answering facilities, and all Emergency Triple Zero calls on the islands are diverted in the island network to these Emergency Services.

The Indian Ocean Territories Administration manages emergency communications, including VHF marine radio and the VHF Fire and Emergency service radio. A number of towers supporting these services and other communications are owned by the Government.

## Broadcasting services

The Indian Ocean Territories Administration oversees digital and radio communications infrastructure, including emergency communication infrastructure.

Through the VAST signal, the Cocos (Keeling) Islands have access to ABC and SBS television and radio services as well as a selection of commercial free-to-air channels, with services provided by WIN and Prime which draw on programming from the 7, 9 and 10 Networks.

There are a range of radio services available to the Cocos (Keeling) Islands communities. 6CKI Cocos (Keeling) Islands is the local community radio service, via 96.0 FM on West Island and 102.7 on Home Island. Residents also receive Red FM commercial radio from Western Australia and ABC National Radio and Triple J Radio via the 109.1 FM repeater. The ABC Kimberly (an ABC Local radio service) is also accessible via 102.1 FM.

## Norfolk Island infrastructure and services

Norfolk Telecom is the main provider of telecommunications services to Norfolk Island. Norfolk Telecom is a business enterprise of the Norfolk Island Regional Council and operates under the *Telecommunications Act 1992* (NI). Norfolk Telecom owns and operates telecommunications infrastructure, and provides business and residential telecommunications and internet services to Norfolk Island.

## Satellite services

NBN Co's Sky Muster satellites serve Norfolk Island with a dedicated satellite beam. As of December 2020, there were 804 premises on Norfolk Island with an active NBN service. Across the 2020 calendar year 54 service faults were recorded. NBN Co's BSS services are not currently available on Norfolk Island.

Many residents have both NBN Sky Muster™ and Norfolk Telecom ADSL services to provide redundancy if one service is not working. Some Norfolk Island premises have their own commercial satellite service agreements and dishes.



## Fixed-line infrastructure and services

Norfolk Island is not currently connected to a fibre-optic submarine cable. Fixed-line services depend on satellite connections for backhaul, meaning they are subject to satellite bandwidth and latency limitations and the impacts of weather and atmospheric conditions.

Norfolk Telecom uses the private satellite provider O3b for backhaul. The Department understands that Norfolk Telecom is in the process of changing backhaul providers, and that from 31 March 2021, SparkNZ will provide satellite backhaul services. Norfolk Telecom runs primary and secondary satellite earth stations for the satellite backhaul service.

Norfolk Telecom runs a central public exchange, which switches both international and national traffic, and provides PABX services to businesses and accommodation houses.<sup>16</sup>

Customers connect to the Norfolk Telecom network using ADSL over copper telephone lines between their premises and nodes, and then through fibre-optic cables from the nodes to the Norfolk Telecom central office (this is termed 'fibre-to-the-node').

Wi-Fi hotspots are available at key locations around the island.

## Mobile Network

Until 12 January 2021, Norfolk Telecom offered a 2G mobile network for Norfolk Island, operating on a GSM Mobile switch including eight remote base stations and one micro cells. This network only supported voice and SMS services and was obsolete.

On 12 January 2021, Norfolk Telecom's new 3G/4G mobile network went live. The Australian Government contributed \$3.54 million toward the project through the Building Better Regions Fund. The 3G/4G network provides coverage across the island, is more reliable and offers broadband mobile data. The network is a 4G LTE network with 3G for circuit switch fall back, to boost the quality of mobile data services and provide faster and more reliable internet connectivity. 3G services operate on 900 MHz (Band 8) and the 4G network operates on 700 MHz (Band 28).

Calls to and from the Island generally incur international rates.

## Emergency communications

Norfolk Telecom operates an emergency call service using the numbers 000 and 112. The call is connected to an interactive voice response system and the caller must select the appropriate emergency service organisation to have the call transferred. Alternatively, there are direct numbers for fire (955), police (977) and ambulance (911).

The Commonwealth telecommunications framework does not currently apply to Emergency Calls that originate on Norfolk Island. Norfolk Island's existing arrangements are proportionate to the needs of the Norfolk Island community. Importantly, the existing arrangements minimise both delay and the risk of dropped calls by keeping call handling entirely on-island. Given Norfolk Telecom's satellite backhaul solution, if Norfolk Island's emergency calls had to be routed to the Australian mainland to be answered by Telstra (in its role as Emergency Call Person), the calls would be routed via New Zealand (or potentially Hawaii in the event Norfolk Telecom shifted its voice traffic onto O3b links).

## Broadcasting services

There are two local radio services on Norfolk Island. Radio Norfolk (available on 89.9 FM and 1566 AM) is owned and operated by the Norfolk Island Regional Council and was the first NI radio station. A second radio station, Pines FM, commenced several years ago and operates on 99.9 FM. ABC radio services can also be received (via satellite): ABC

<sup>16</sup> Norfolk Island Regional Council (NIRC), [Telecom](#), NIRC, n.d., accessed 19 January 2021.

Regional (from Dubbo) on 95.9 FM, ABC Radio National on 91.9 FM and ABC Triple J on 98.2 FM. The local television station (Channels 350 and 352) previously focussed on NI tourist matters but in 2018 were acquired by the Seventh Day Adventist Church to provide Australian and overseas religious programming. During COVID, with closure of the NI Church, the channels have also been used for streaming Church services.

Each of these services is licensed under the NIBA. Once the BSA commences, Radio Norfolk will be deemed to be a community radio service with a five year licence. Pines FM will be able to apply for a Temporary Community Broadcasting Licence which operates for 12 months, but can apply for a new licence prior to the original licence expiring. The Adventist television service can apply for an open narrowcasting television licence. Major changes to the content provided by the local broadcasters are not expected, but in the lead up to the transition to the BSA, the operators have been advised of their obligations under the BSA by ACMA.

The allocation of any future local television and radio services is dependent on the planning and licensing processes undertaken by ACMA. These may be subject to changes as a result of the Media Reform Green Paper.

Through the VAST signal, Norfolk Island has access to ABC and SBS television and radio services as well as a selection of commercial free-to-air channels, with services provided by Imparja Television and Southern Cross Austereo which draw on programming from the 7, 9 and 10 Networks.

## Services on the Coral Sea Islands and Ashmore and Cartier Islands

Sky Muster services are available on the only inhabited Coral Sea Island, Willis Island. The Bureau of Meteorology (the only inhabitant) has a weather monitoring station on the island and is using the BSS to support its operations (including for staff rostered to live on the island). Sky Muster services are not available on Ashmore and Cartier Islands as they are uninhabited (and so do not have any premises).

# Future opportunities in communications technologies and infrastructure

A range of emerging communications technologies have potential to improve the quality of internet services available in Australia's external territories. Improvements in internet services will likely support increased economic activity and social engagement and interaction. There are significant uncertainties about the pricing and levels of service that will be offered using these emerging technologies, as well as the timeframes for delivery.

## Satellite Connectivity

### Privately-owned Satellite Constellations

Next generation privately-owned satellite networks may be able to bring connections with higher-bandwidth, lower-latency and greater robustness.

Constellations of low Earth orbit (LEO) satellites could offer rural and remote areas access to high-speed broadband with lower latency and higher bandwidth than current geostationary satellite offerings, enabling applications such as videoconferencing that are data-intensive and require near real-time responsiveness.<sup>17</sup> LEO satellite constellations can also support remote networks of Internet of Things (IoT) devices, facilitating applications like asset management, environment monitoring, and telematics.<sup>18</sup>

Several companies are currently developing LEO satellite constellations to provide high-speed broadband connectivity. OneWeb (UK/India) and SpaceX (USA) have taken preliminary steps in seeking regulatory approval from the Australian Communications and Media Authority (ACMA) to provide broadband services using LEO satellite constellations in Australia.<sup>19</sup> Both companies also purchased area-wide mmWave apparatus spectrum licences in December 2020.<sup>20</sup> The broadband service offered by the SpaceX 'Starlink' constellation is currently being tested in the United States and reportedly offers speeds of between 50 Mbps and 150 Mbps, with latency of between 20ms and 40ms.<sup>21</sup>

It is uncertain when these LEO satellite services will become available in Australia. In 2018, the Commonwealth Scientific and Industrial Research Organisation (CSIRO) projected that high-speed broadband offered by LEO satellite constellations could be available in Australia in some form within the next five to ten years.<sup>22</sup> The characteristics of the LEO satellite broadband market will be contingent on the number of providers that can successfully achieve sustainable business models, which may be challenging given the substantial capital investment required to establish a functional

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<sup>17</sup> Broadband Commission for Sustainable Development (BCSD), [Working Group on Technologies in Space and the Upper-Atmosphere: Identifying the potential of new communications technologies for sustainable development](#), September 2017, p. 26, accessed 21 January 2021.

<sup>18</sup> CSIRO Futures, [Space: A Roadmap for unlocking future growth opportunities for Australia](#), CSIRO Futures, 2018, p. 10, accessed 21 January 2021;

Myriota, [Homepage](#), Myriota website, 2021, accessed 21 January 2021.

<sup>19</sup> Australian Communications and Media Authority (ACMA), [Update to Foreign Space Objects Determination - consultation 34/2019](#), ACMA, October 2019, accessed 21 January 2021;

Radiocommunications (Foreign Space Objects) Amendment Determination 2017 (No. 1), [Explanatory Statement](#).

<sup>20</sup> ACMA, [Successful applicants announced for 5G millimetre wave spectrum](#), ACMA, 18 December 2020, accessed 21 January 2021.

<sup>21</sup> Michael Sheetz, [SpaceX prices Starlink satellite internet service at \\$99 per month, according to e-mail](#). CNBC, 27 October 2020, accessed 21 January 2021.

<sup>22</sup> CSIRO Futures, [Space: A Roadmap for unlocking future growth opportunities for Australia](#), CSIRO, 2018, p. 10, accessed 21 January 2021.

constellation.<sup>23</sup> It is uncertain whether LEO satellite broadband services will be offered to Australian consumers directly, or sold wholesale to telecommunications carriers.<sup>24</sup> The particular nature and pricing of the services that will be made available is also unknown. Ground stations with specialized antenna may be required to receive, process and transmit data.<sup>25</sup>

LEO satellite constellations can also be used to support networks of IoT devices. Myriota, an Australian satellite technology company, operates a LEO 'nanosatellite' constellation to provide internet connectivity for IoT devices in Australia with low data and time-sensitivity requirements, and plans to build capacity to offer real-time data services over the next several years.<sup>26</sup> Adelaide-based company Fleet Space also uses a small constellation of LEO nanosatellites to offer support for remote networks of IoT devices in Australia.<sup>27</sup>

Commercial entities are also planning to improve geostationary and medium Earth orbit satellite offerings. These services are unable to offer the low latency promised by LEO satellite constellations, but technological developments over the last decade have improved the broadband services offered by geostationary satellites.<sup>28</sup> Optus has partnered with Airbus Defence and Space to launch a high-throughput geostationary satellite in 2023, which it states will cover both the Cocos (Keeling) Islands and the majority of the Pacific.<sup>29</sup> This is anticipated to primarily service government departments, broadcasters, and business customers.<sup>30</sup> Pivotal Satellite, an Australian mobile carrier specialising in mobile satellite services, has partnered with satellite operator SES to provide 'fibre-like connectivity' to Australia and the Pacific Islands using a constellation of medium Earth orbit satellites. Operations are anticipated to commence in the second half of 2021.<sup>31</sup>

## Developments in NBN™ Satellite Capability

Since Sky Muster satellite broadband services commenced in April 2016, NBN Co has continued to improve end-user experience. Continual development of the available products has significantly increased service quality including download capacity. The introduction of the Sky Muster Plus and BSS products demonstrates these improvements. NBN Co will continue to improve and develop satellite services wherever possible.

NBN Co continues to develop products which deliver more efficient services with greater capabilities, however Sky Muster Satellite infrastructure has a set capacity which cannot be increased so this must be managed by NBN Co to ensure ongoing quality of service for all end-users.

## Undersea Cable Connectivity

Optical fibre can support bandwidth speeds in excess of 10 gigabit speeds per fibre. A single connection (spur) would provide bandwidth that would meet the needs of an entire island, although the benefit to customers would depend on the quality of the customer access network serving them.

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<sup>23</sup> Chris Daehnick et al, [Large LEO satellite constellations: Will it be different this time?](#), McKinsey & Company, 4 May 2020, accessed 21 January 2021; David Jarvis, [Five key uncertainties around high-speed Internet from low Earth orbit](#), MyITU, 18 August 2020, accessed 21 January 2021.

<sup>24</sup> Peter B. de Selding, [SpaceX Starlink: We'll stay direct-to-consumer, at least in U.S.; work continues on lowering user terminal cost](#), Space Intel Report, 13 November 2020, accessed 21 January 2021.

<sup>25</sup> See <https://www.satelliteevolutiongroup.com/articles/LEO-Constellations&Tracking.pdf>

<sup>26</sup> Myriota, [Homepage](#), Myriota website, 2021, accessed 21 January 2021.

<sup>27</sup> Fleet Space, [Frequently Asked Questions](#), Fleetspace, 2020, accessed 21 January 2021

<sup>28</sup> Broadband Commission for Sustainable Development (BCSD), [Working Group on Technologies in Space and the Upper-Atmosphere: Identifying the potential of new communications technologies for sustainable development](#), September 2017, p. 19-23, accessed 21 January 2021.

<sup>29</sup> Optus, [Optus set to launch game-changing new satellite in 2023](#), Optus, 02 July 2020, accessed 21 January 2021

<sup>30</sup> Sasha Karen, [Optus reaches for the stars with 2023 satellite launch](#), ARN, 02 July 2020, Accessed 21 January 2021; Mark Holmes, [Optus Exec Says Software-Defined Satellite Will Give Telcos Flexibility, Via Satellite](#), 24 August 2020, Accessed 21 January 2021.

<sup>31</sup> Satnews, [SES Signs With Pivotal To Build A Ground Station In Australia For O3b mPOWER Constellation](#), Satnews, 14 December 2020, accessed 21 January 2021

Unlike satellite technology, optical fibre connections are less susceptible to external ground interference effects and are not impacted by atmospheric interference, solar and cosmic radiation, changes to the Earth's magnetic field, and physical damage from solar energetic particles and meteors. However, these benefits need to be weighed against the cost, noting the cost of a satellite system can be shared over a larger area and a larger population. In addition, the deployment of a submarine cable by itself is unlikely to improve connectivity outcomes if the quality of the customer access network is poor (either mobile or fixed).

The increased dependency on internet connectivity for emergency and critical services necessitates continued use of satellite services to provide an alternative connection for fail-over purposes.

## Opportunities for a Cable Spur to Norfolk Island

Norfolk Island is not currently connected to any submarine fibre-optic telecommunications cables. A fibre-optic cable could boost reliability and speed of telecommunications services on the Island with accompanying flow-on benefits, but at a high cost both in absolute terms and per head of population.

While a submarine cable connection could provide Norfolk Island with high-bandwidth, low-latency backhaul not subject to disruption from weather and atmospheric conditions, the cost to lay and connect submarine cables is typically relatively high and the benefit relatively isolated compared to a satellite system that can service a much larger population. For example, in its submission to the ACCC's Domestic Transmission Capacity Service Final Access Decision, on 12 July 2019, Vocus announced that the total cost of its Australia Singapore Cable was US\$170 million, equivalent to a construction cost of around A\$50,000 per kilometre. Further, additional costs would likely be generated by the need for an undersea branch and Norfolk Island landing station. In other contexts, submarine cable operators have identified that the useful life of a submarine cable is about 25 years, and if cable was funded replacement capital would need to be factored in.<sup>32</sup> Users of a cable's capacity would also be subject to ongoing access fees and charges from the cable operator. Additionally, as noted above, the condition of the existing network connecting premises on Norfolk Island would limit the quality of services available.

## Other emerging technologies

Emerging mobile telecommunication technologies may also support internet connectivity in remote areas. 5G networks have the potential to offer low-cost wireless broadband in areas with otherwise limited broadband access, using novel technological features such as dynamic spectrum sharing and networking slicing.<sup>33</sup> In Australia, NBN Co has recently achieved a world record for long-range 5G transmission using mmWave spectrum, with a view to improving fixed wireless broadband in regional and rural areas.<sup>34</sup> However, to date, no operators have indicated an intention to establish 5G services in Australia's external territories, noting their 5G rollout in Australia only commenced in earnest in 2020.

High altitude platform stations (HAPS) also have the potential to provide internet connectivity to users in remote areas. The International Telecommunication Union (ITU) defines a HAPS as a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.<sup>35</sup> HAPS are situated significantly closer to the Earth than LEO satellites, offering lower latency, and have the potential to be deployed in shorter timeframes and with lower capital costs than satellite constellations or terrestrial networks.<sup>36</sup> While HAPS can operate as an independent system connected to a ground base station, recent trials have featured HAPS integrated with satellite or terrestrial networks.<sup>37</sup>

<sup>32</sup> ACCC, DTCS Final Access Determination, [Final report](#) [PDF], ACCC, p. 15, accessed 22 January 2021

<sup>33</sup> Cisco, [On Remote Scottish Islands, the Promise of 5G Unfolds](#), Cisco, 24 June 2019, accessed 22 January 2021

<sup>34</sup> NBN Co, [nbn sets 5G long-range transmission world record](#) [PDF], NBN Co, 13 January 2021, accessed 22 January 2021

<sup>35</sup> ITU Radio Regulations, 1.66A.

<sup>36</sup> ITU, [HAPS – High-altitude platform systems](#), ITU, December 2019, accessed 22 January 2021

<sup>37</sup> Loon, [home page](#), Loon, 2021, accessed 22 January 2021; Working Group on Technologies in Space and the Upper-Atmosphere, [Identifying the potential of new communication technologies for sustainable development](#) [PDF], Broadband Commission for Sustainable Development, September 2017, accessed 22 January 2021

The technology is still in its early stages of development. HAPSMobile, owned by Japanese conglomerate Softbank Group, has announced an intention to trial the delivery of broadband using HAPS technology in Queensland, and aims to offer services to Australian consumers by 2023.<sup>38</sup>

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<sup>38</sup> Ry Crozier, [HAPSMobile to run drone broadband trial in Queensland skies](#), iNews, 12 March 2020, accessed 22 January 2021

# Barriers relating to communications infrastructure

A number of barriers arise from current and potential future communications infrastructure and external effects on communications infrastructure in the external territories.

## Access costs

Access to internet and mobile coverage in Australia's external territories can be relatively costly, due to remoteness, a small population to bear infrastructure capital and operational costs and backhaul costs, and a lack of market competition. Connectivity and speed issues in remote locations can increase costs for consumers and businesses as they may purchase additional devices and hardware to access communications services or seek to improve the reliability of connections.

## Backhaul costs

A significant cost affecting remote communications services is the capital and operational costs of backhaul. Backhaul connects access points (e.g. in the external territories) to a central communications network (e.g. in mainland Australia). Backhaul can be provided through different technologies such as microwave links, fibre-optic cables or satellite links. Regardless of technology, for remote isolated communities backhaul comprises a significant cost component. The cost of backhaul in the external territories is relatively high due to their remote geographic location.

Christmas Island is connected through an optical fibre cable spur to Vocus' Australia-Singapore cable, enabling this larger investment to be leveraged. Norfolk Island is serviced by satellite backhaul. The Cocos (Keeling) Islands are serviced by satellite backhaul.

## Power outages

Where backup power supplies are not available, telecommunications and internet service provision can be compromised during power outages. Power outages may occur through generator or transmission network failures caused by high demand, faulty infrastructure, or external factors such as severe weather. During complete blackouts or brown outs, services can drop out and may be inaccessible for extended periods until power is restored. Interruptions to services can cause lost revenue for small businesses, productivity losses, and prevent communication with organisations or businesses elsewhere.

## Weather and other natural phenomena

The remote oceanic locations of the external territories presents a relatively high risk of extreme weather events such as cyclones and heavy rainfall. Weather can impact service provision by disrupting connections, by increasing system resilience and redundancy requirements, and, where damage from weather occurs, by imposing repair and recovery costs. Increased system resilience and redundancy requirements can lead to higher equipment, construction and maintenance costs.

Satellite services are vulnerable to disturbance from severe weather events. Transmissions between satellites and ground stations are susceptible to interference from other sources on the Earth's surface, atmospheric interference (e.g. arising from severe weather conditions or irregularities in the ionosphere), solar and cosmic radiation, changes to the Earth's magnetic field, and physical damage from solar energetic particles and meteors.

## Infrastructure construction and maintenance issues

The cost of telecommunications technology provision and upgrades is a key challenge for the external territories. The 2019 Infrastructure Australia audit noted that, in rural and remote settings, the costs increase as population density falls and the returns from telecommunications infrastructure decline. This means that there can be limited commercial incentive for the private sector to provide communications services to the external territories. These issues are expected to continue with high rollout costs for new technologies such as 5G mobile networks, which may require additional physical infrastructure compared to 3G and 4G networks. There is potential for this to exacerbate existing connectivity and affordability issues in rural and remote areas, such as the external territories.

Installation costs can be higher in an island context. The remote geographical location of the external territories leads to relatively high costs and long timeframes for freighting of equipment and materials, construction, and operation of infrastructure. The availability of appropriately skilled labour can also hamper works. These factors also create ongoing challenges for the maintenance of infrastructure and rapid restoration of services following unplanned outages.

Examples of telecommunications infrastructure project construction and installation costs in remote Australian and Pacific locations include:

- \$11 million to upgrade telecommunications radio network for Flinders Island and Cape Barren (2017);
- \$7 million to upgrade mobile network coverage in the Torres Strait to 4G (2019);
- \$4.6 million to install a 4G mobile network on Norfolk Island (2019);
- \$0.8 million to replace the 2G mobile network on the Cocos (Keeling) Islands with 4G (2019);
- \$137 million for the Coral Sea cable system connecting Port Moresby (Papua New Guinea) and Honiara (Solomon Islands) with Sydney (2019); and
- US\$30 million for the Palau undersea fibre optic cable (2020).

## Small markets

Similar to other very remote areas in Australia, the small population of the external territories affects the supply of communications in a number of ways, typically leading to some subsidisation of costs so that prices are uniform or comparable to those in more populous areas. This is effectively what happens under the USG arrangements discussed above, with the voice services provided by Telstra and the broadband services provided by NBN Co being significantly subsidised in remote communities. Where mobile networks operate, their provision in less populous area may be cross-subsidised internally so as to provide the majority or users in more populous commercial areas the benefit of greater mobile coverage while all users enjoy the same uniform pricing regardless of locality, while noting mobile services by definition are not location specific. Where such arrangements do not exist, small markets may not have the benefit of sharing costs across a much wider customer base removing the scope to reducing cross-subsidise high costs.

The small size of the territories' markets and their remoteness acts as a disincentive for the entrance of new telecommunication service providers and local broadcasters. The marginal economics, driven partly by high operating costs, present particular challenges when there are more than one or two providers operating in the market. Fluctuations in demand, caused for example by tourist numbers changing with seasons or the current pandemic, can create significant market uncertainty and make the difference between a profit and loss.

The small population among which to spread costs affects infrastructure upgrade and replacement cycle length. Where business models for new and emerging technologies are untested and viability for the external territories is unclear, service providers may be more likely to delay adoption.

The capital and ongoing costs incurred by service providers are likely to be passed on to consumers through service charges, and, absent subsidisation, may be greater on a per capita basis due to small populations. This can exacerbate existing socio-economic disadvantage in the external territories by imposing additional costs on residents, particularly critical with the economic impact of COVID-19. Further, the lack or absence of competition in some external territory communications markets means there is not the downward pressure on prices that would be found in larger markets.



## Flow-on impacts

Communications services are now generally accepted to be essential for daily life, work and study and this is only increasing. A lack of access to communications infrastructure and services can lead to isolation from social connection and employment opportunities. Inadequate communications services can exacerbate existing social inequities, particularly for low income households, people with lower levels of education, those aged over 65, and people with disability. Comparatively poor connectivity may also lead some residents and businesses to leave the external territories and discourage new workers or families to move to the external territories for business or employment opportunities. There is a clear continuing economic and social need for strong communications services in the external territories.

Challenges of a satellite based communications system include services disruptions during extreme weather events, as well as limited capacity and latency issues. This means opportunities to provide services that rely on real-time connections such as communications during emergency responses, telehealth consultations or virtual classrooms may be limited.

## Opportunities and benefits arising from communications infrastructure

The benefits of improved communications infrastructure are broad and far reaching. Connectivity enables new ways to communicate and socialise, and new industries and businesses, by enhancing the speed and quality of information sharing. In turn, this encourages collaboration and innovation, and accelerating economic and social growth.<sup>39</sup> Internet access has also revolutionised the way essential public services, such as healthcare and education, are provided.

Regional businesses with fixed-line broadband services in addition to reliable mobile coverage from at least one mobile network operator are in a strong position to take advantage of new digital applications and economic opportunities. Such businesses are well placed to take up new and innovative digital developments from an infrastructure perspective. Businesses in regional, rural and remote locations like anywhere else need good quality and reliable connectivity to maximise economic opportunities in the same way.<sup>40</sup>

Communications infrastructure can also enable the use of innovative solutions to promote economic development in the external territories, such as remote monitoring of energy, port or sewage infrastructure, smart electricity grids, innovative agricultural technology solutions, smart meters, remote monitoring energy efficiency of buildings, port automation technologies, autonomous vehicles, connectivity to mainland industry associations and services.

There are persuasive arguments for significant investment in telecommunications infrastructure to maximise the economic opportunities and economy-wide benefits that are available for people in regional, rural and remote Australia. The 2018 Regional Telecommunications Review Future noted the need to adopt a strategic place-based approach to guide future telecommunications investments. While the USG provides access to baseline services nationally, a place-based approach gives effect to local and national goals, through targeted investment in telecommunications infrastructure that is specifically suited and tailored to the particular requirements of each region. Examples of funding programs that centre on place-based approaches to maximise benefits include the Regional Connectivity Program and the Building Better Regions Fund.

Continued improvements in connectivity in Australia's external territories will support local businesses by strengthening connections with mainland Australia and internationally, and will provide further opportunities for residents to work, study and train remotely. Improvements will also ensure residents and businesses have access to services, which is increasingly important as governments and businesses move services online.

## Opportunities in the Indian Ocean Territories

The Indian Ocean Territories Regional Development Organisation (IOTRDO) has worked closely with the communities in the region to develop strategic plans. Both the Christmas Island and Cocos (Keeling) Islands Strategic Plans emphasise community support for increased tourism, small business growth and investment opportunities in the region. Both Strategic Plans also highlight the potential impact of the growing nearby Asian markets on tourism growth and investment. These ventures all require widespread access to reliable communications infrastructure to connect within the region, to mainland Australia and overseas markets.

The *Our Christmas Island 2030 Strategic Plan* (CI Strategic Plan) was also informed by an extensive consultation process with the Christmas Island community. It identifies a high speed internet network that opens up industry, research and training opportunities as a comparative advantage for the island. A priority action in the CI Strategic Plan is completing case studies on how to capitalise on Very Fast Internet, for example how faster streaming could accelerate telehealth,

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<sup>39</sup> Deloitte, [Value of connectivity: Economic and social benefits of expanding internet access](#), Deloitte, 2014, p. 2, accessed 18 January 2021.

<sup>40</sup> Australian Government, [2018 Regional Telecommunications Review: Getting it right out there](#), Australian Government 2018, p. 2, accessed 18 January 2021

online training, on-site inspections and emergency recovery responses, and attract industries and businesses that are not tied to specific locations.

The *Our Cocos (Keeling) Islands 2030 Strategic Plan* (CKI Strategic Plan) developed in consultation with the community also highlights the importance of access to health and education services. Access to reliable internet and mobile networks promote further education opportunities such as remote learning at mainland institutions. In particular, the CKI Strategic Plan notes the importance of telehealth services for the community, which depend on reliable communications infrastructure.

Communications infrastructure has been vital for the IOT communities staying connected throughout the COVID-19 pandemic. In response to the mental health stresses of social isolation and travel restrictions, the Indian Ocean Territories Health Service (IOTHS) increased access to telehealth psychology services for IOT residents. The Emergency Telehealth Service was also fast-tracked for IOT residents through the Western Australian Health Command Centre. Broadband services were also essential for the development and distribution of public health messaging to the community through email bulletins and social media updates.

## Opportunities for Norfolk Island

Community consultation conducted in the development of Norfolk Island's *Community Strategic Plan 2016 – 2026* ranked 'quality internet services' and 'professional and efficient services' as the sixth and seventh most important issues for residents. A key objective of the Plan recognises the need to plan for additional demand for resources on NI, including telecommunications infrastructure, to keep pace with demand. The speed and reliability of internet and mobile technology was listed an indicator of success.<sup>41</sup>

With its heavy reliance on tourism,<sup>42</sup> Norfolk Island's economy was profoundly impacted by the COVID-19 pandemic and associated travel restrictions. Improved communications infrastructure could assist diversification of the economy by better supporting the relocation or establishment of businesses that rely on connectivity, as well as boosting efficiency and productivity for professional services already operating on Norfolk Island.

The Department recognises the importance of extending the Commonwealth communications legislation to Norfolk Island to achieve consistency in regulatory approaches. A measured approach is being taken to ensure there are no unintended consequences from extension of the frameworks.

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<sup>41</sup> Norfolk Island Regional Council (NIRC), [Community Strategic Plan 2016-2026](#), NIRC, p. 14, 17-18, 21 September 2016, accessed 22 January 2021.

<sup>42</sup> KPMG, [Monitoring the Norfolk Island Economy](#), KPMG, 2019, p. iv, accessed 22 January 2021.

## Conclusion

The Department thanks the Committee for the opportunity to make a submission to the inquiry into enabling communications infrastructure in Australia's external territories, and hopes that this submission assists the Committee in understanding existing communications infrastructure and services and future prospects in Australia's external territories.

The Australian Government remains committed to supporting access to high quality, reliable and affordable communications services in the external territories, by facilitating communications markets that support new commercial ventures and competition, driving cheaper prices and improving consumer choice. Australian Government investments in telecommunications upgrades in the external territories through the Building Better Regions Fund and NBN Co's Sky Muster satellite service, are giving residents and business greater access to telecommunications services and improved data capability and connectivity.

The Department looks forward to the findings of the inquiry.