Strategic Review of Satellite and Space Science use of Spectrum

Satellite workshop
3 July 2015

Agenda

09:30 – 10:00	**Arrival and refreshments**
10:00 – 10:30	**Introduction**
10:30 – 12:00	**Stakeholder presentations** BDUK – Matt Agar HNS – Chris Britton **CFI Questions** *12.00 Minute silence to remember victims of the Tunisian beach attack*
12:00 – 12:45	**Lunch**
12:45 – 14:30	**CFI Questions – Continued**

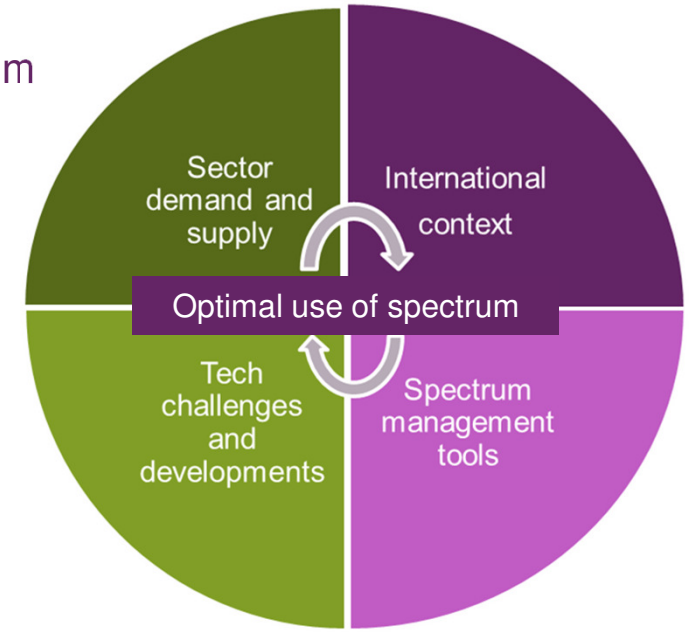
INTRODUCTION

Context of competing demands

- Requirements for wireless services are likely to increase for many spectrum uses.
- This will lead to **growing competing demands** for key spectrum resources.
- Adopting **technologies that enable more efficient use** of spectrum will be crucial.
- There will still be **increased pressures on spectrum,** especially in concentrated geographical locations.
- Competing demands will need to be addressed by a mix of new and existing tools
  - **spectrum re-purposing** to higher value uses and
  - greater use of **spectrum sharing**.

Ofcom's overall spectrum strategy

- **Get more out of spectrum** by promoting 'better spectrum neighbours'
  - New and existing forms of spectrum sharing
  - Focus on coexistence challenges
  - Promote improved radio performance standards
- **Achieve the UK's objectives by playing a leading role in international spectrum debates**
- **Help markets to work**
  - Make more information on spectrum use available
  - Liberalise spectrum use where possible
- **Prioritise our efforts on specific sectors / bands**
  - Analyse supply and demand



We undertake strategic reviews to inform future priorities and policy in context of competing demands

Overall Spectrum Management Strategy

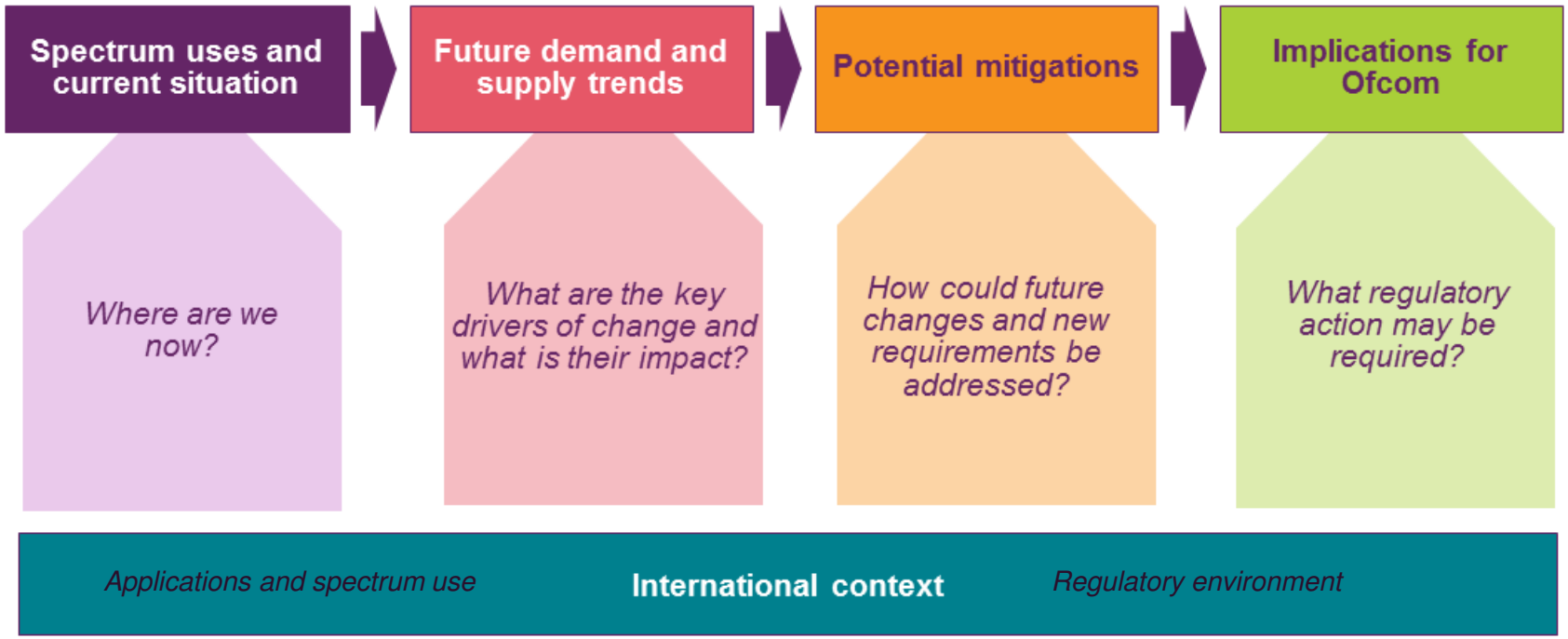
What's their purpose?

- Refine our understanding of:
  - specific sectors / bands
  - future **trends**
  - implications for spectrum **supply** and **demand**
- In order to inform our future:
  - **priorities**
  - **policy** decisions

What are we doing?

- *Satellite and Space Science*
- UHF bands 1 & 2 (420-470 MHz)
- Programme Making and Special Events (PMSE)
- Mobile Data

Our approach to the satellite and space science strategic review



Scope of the satellite sector strategic review

(including satellite telecommunications, broadcasting and navigation)

Illustrative value chain

End user applications

- Direct-to-Home Broadcast TV
- Broadband internet access
- Machine-to-Machine (M2M)
- Commercial Mobility
- Corporate Networks
- Emergency distress alert
- Navigation including location based

Other applications

- Distribution
- Contribution and OU TV
- Legacy telephony and carrier
- Telemetry, tracking and command
- Military and government use

Benefits to UK citizens and consumers

International context

Context to our CFI questions

Current situation, future trends, mitigations & implications

	Spectrum uses and current situation	Future demand and supply trends	Potential mitigations	Implications for Ofcom
What we are asking, and why	To refine our understanding of current uses of spectrum • applications used • services provided • frequencies used • value chain role	To build on our understanding of future demand and supply • demand and supply drivers • industry trends	To identify factors mitigating future demand • tech improvements, efficiencies and coordination • changes to standards • new allocations	Based on the outcome of our analysis consider whether, and what type of, regulatory action may be appropriate
How will we use the CFI information	Create a consolidated view of the sector by: • defining metrics to assess current level of demand • confirming the role of players in the value chain	Develop a qual. & quant. view of demand and supply by: • linking drivers and trends • analysing trends and drivers impact on metrics	Refine our view of future demand and supply by: • categorising mitigations against trends / drivers • analysing the impact of mitigations	

Next steps

- **Friday 10 July:** Space Science workshop (including earth observation and meteorology, space research and radio astronomy)
- Closing date for responses 13 August
- Develop our views on sectors, future trends and implications for spectrum
- Update on findings in early 2016

STAKEHOLDER PERSPECTIVE

Matt Agar, Broadband Delivery UK

Chris Bitton, HNS Europe

OVERVIEW OF QUESTIONS

Current situation (questions 1-2, 4-7)

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- **Question 1:** Do you have any comments on our approach to this review?
- **Question 2:** Do you have any comments on our broad overview of the satellite sector set out in this section?

  In particular, do you have comments on the completeness of the list of applications, their definitions and their use of the relevant ITU radiocommunications service(s)?

End user applications

- Direct-to-Home Broadcast TV
- Broadband internet access
- Machine-to-Machine (M2M)
- Commercial Mobility
- Corporate Networks
- Emergency distress alert
- Navigation including location based

Other applications

- Distribution
- Contribution and OU TV
- Legacy telephony and carrier
- Telemetry, tracking and command
- Military and government use

Question 4: Do you have any comments on our representation of the value chain for the satellite sector? How do you think industry revenues are broken down between players at different positions in the chain?

Question 5: What is the extent of your organisations' role(s) in the value chain? Which satellite applications (as summarised in Table 1 in section 3) does your organisation:

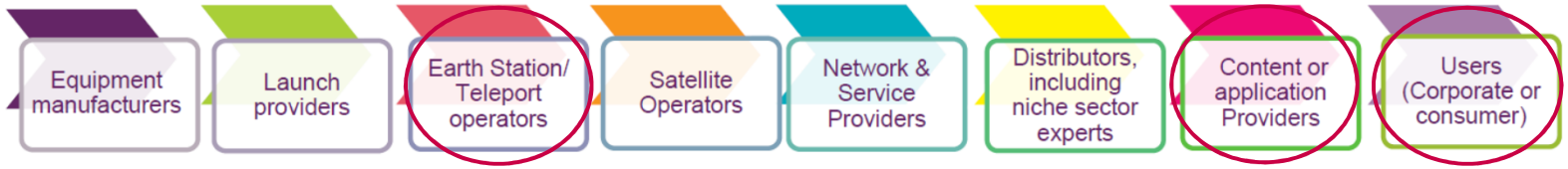
- use;
- provide: or
- help to deliver?

Please list all applications that apply and your role in each in your response.

Example of a simple response to Q5…

What is the extent of your organisations' role(s) in the value chain?

***OfNews** is a **TV news channel**, offering content that can be watched by users through DTH TV via satellite. We see ourselves as belonging to the role of '**content or application providers**', although we are also '**corporate users**', as we sometimes edit content that is delivered to us over satellite and also an '**earth stations operator**', as we manage a fleet of transportable earth stations used for Satellite News-Gathering (SNG).*



Which satellite applications (as summarised in Table 1 in section 3) does your organisation **use**, **provide** or **help to deliver?** Please list all applications that apply and your role in each in your response.

*We **use** '**DTH Broadcast TV**' and we **provide** '**DTH Broadcast TV**' to end users (people watching our TV news channel) - see next slide. Furthermore, we also often **use** applications belonging to the '**Contribution and OU TV**' category, for example when our satellite news gathering trucks transmit live events from remote locations to our studios in central London.*

Clarification on the response to Q5…

User, **provider** or someone who **helps to deliver**?

With regard to '**DTH Broadcast TV**', in our proposed sample answer to Q5 we indicated OfNews as being:

- An ***user*** of that application, because they may use contents from other channels for producing their news; and
- A ***provider*** of that application, because it's their main business to offer news contents to their customers (i.e., the people watching their channel on TV).
- There may be though other links of the satellite value chain who *help to deliver* that application with regard to the content produced by OfNews, such as a satellite operator providing the needed capacity on board its fleet.

With regard to '**Contribution and OU TV**', in our proposed sample answer to Q5 we indicated OfNews as being an ***user*** of that application, as, among other things, it's through it that they can achieve their business' objectives.

Question 6. For each of the satellite applications you use, provide or help deliver (as identified in Question 5), and taking into account your role in the value chain, where applicable please provide:

- the specific spectrum frequency ranges used for each application, distinguishing between the frequencies used for service provision, for the feeder / backhaul links and for TT&C;
- the coverage area for services links; or, in the case of TT&C and feeder / backhaul links, the location of the gateway station(s);
- the estimated number of users (e.g. MSS terminals, DTH subscribers, FSS earth stations);
- an estimate of the average use by end user (for those applications for which the demand for spectrum is driven by end user traffic); and
- for applications for which the demand for spectrum is driven by other factors, please state what the factor is and the scale of the factor (e.g. for DTH TV the number of TV channels broadcast by format).

Please provide your response with respect to the UK, the rest of Europe, and other parts of the world where this may be relevant to UK use.

Example of a simple response to Q6…

Question 6: For each of the satellite applications you use, provide or help deliver (as identified in Question 5), and taking into account your role in the value chain, where applicable please provide:

- the specific spectrum frequency ranges used for each application, distinguishing between the frequencies used for service provision, for the feeder / backhaul links and for TT&C;

  Wrt 'DTH Broadcast TV', our service is provided by the Heathbird satellite located at 10E, through its transponders at centre frequencies 10 750 MHz ± 18 MHz and 11 080 MHz ± 18 MHz. For this purpose, the spectrum is used typically 99.9% of the time in a year.

  Wrt 'Contribution and OU TV', we typically use a varying number of transponders simultaneously (avg: 3, max: 5, typically of 36 MHz bandwidth) onboard GSO satellites at different orbital locations between 8E and 10W. The frequencies ranges typically used are in the range 13.75 – 14.5 GHz (E-to-s) and 10.7 – 11.7 GHz (s-to-E).

Example of a simple response to Q6…

- the coverage area for services links; or, in the case of TT&C and feeder / backhaul links, the location of the gateway station(s);

  Wrt 'DTH Broadcast TV', the coverage area of the services we provide to end users depends on the downlink footprint of the Heathbird satellite. It should be noted that our TV channel is part of an encrypted bundle marketed in the UK only, hence we would assume that the users of our service are not located overseas.

  Wrt 'Contribution and OU TV', our gateways are transportable and are typically located throughout Europe.

- the estimated number of users (e.g. MSS terminals, DTH subscribers, FSS earth stations);

  We estimate that our DTH subscribers are around 500 000 in the UK.

Example of a simple response to Q6…

- an estimate of the average use by end user (for those applications for which the demand for spectrum is driven by end user traffic); and

  N/A

- for applications for which the demand for spectrum is driven by other factors, please state what the factor is and the scale of the factor (e.g., for DTH TV the number of TV channels broadcast by format).

  The demand of the spectrum we require is driven by the following factors:

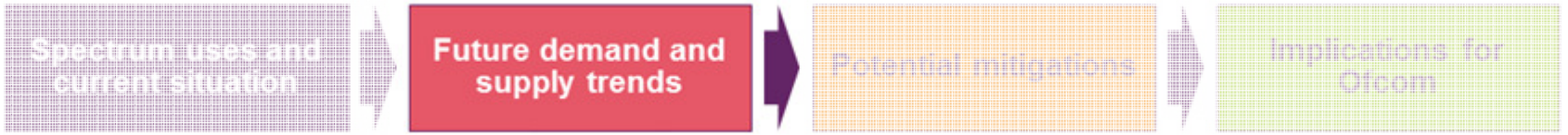
  - *The number of carriers our SNG earth stations have to uplink and downlink at the same time;*

  - *The format of the broadcasted signals (we currently use DVB-S2 to deliver an HDTV service), both for the service and contribution links.*

Question 7: For each of the satellite applications you provide, please could indicate how UK consumers and citizens benefit from their use?

Where possible please also provide an indication of the scale of the benefits (either qualitatively or quantitatively).

Future trends - Questions 8, 9, 10



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Question 8: From your perspective, what high level trends will affect the satellite sector in the coming years?

Question 9: For each of the satellite applications you use, provide or help deliver what do you see as the a) current demand trends; and b) underlying current and likely future drivers of demand for the satellite application(s) your organisation uses or provides?

Please include in your response for both a) and b) above:

- the scale and future impact of the trends/drivers on demand;
- any variations in the type and scale of trends/drivers by geography (i.e. in the UK, the rest of Europe, and other parts of the world where this may be relevant to UK use) and why;
- whether future demand is expected to be temporary or intermittent, and the reasons for this.

In your response, please provide any evidence which supports your position on the drivers of demand (e.g. forecasts, studies and statistics).

Question 10: Taking into account the drivers you have identified in your response to Question 9 above, what (if any) challenges is your organisation concerned about in meeting potential future demand?

Please provide the information by application and band, along with any supporting evidence, if available.

Potential mitigations - Questions 11,12

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Question 11: Do you have any comments on the list of potential mitigations we have identified? What likely impact would each of the mitigations have on spectrum demand? E.g. what order of magnitude increase in frequency re-use might be achieved? To what extent do you believe that these mitigations apply only to certain applications?

Question 12: What other mitigation opportunities do you foresee that we should consider? For what applications are these likely to be applicable and what scale of improvement are they likely to deliver?

Implications for Ofcom – Question 13

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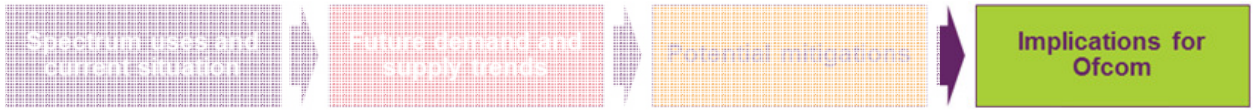

Question 13: Beyond the activities already initiated and planned for the satellite sector (e.g. as part of WRC-15), do you think there is a need for additional regulatory action that may, for example, help your organisation to address the challenges it faces?

In your response, please indicate what type of action you consider may be needed and why, including any evidence to support your view.

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