ADDITIONAL COMMENTS AND ANSWERS TO SPECIFIC QUESTIONS RAISED IN EMERGING ISSUES CONSULTATION DOCUMENT

General Comments

During the review of the consultation document a number of issues were noted. However, it is difficult to bring these to the attention of the Audit team in the context of the specific questions asked but we would be willing to discuss these with the Audit team if this is considered useful. A specific point however that we would wish at this point to bring to the Audit's attention and to remind Ofcom is that there are security issues related to the publication of information relating to the locations of and frequencies used at certain aeronautical radio sites and we would ask that no such details are made available in your published documents. Again we would be willing to explain this in more detail if necessary.

Answers to specific questions

The following contains responses to specific questions relative to NATS that are not covered in our accompanying letter

Band Specific

1. "Aviation" bands are required to be available, 24 hours a day 7 days a week so time based or ad-hoc sharing of aviation bands is not seen as a general possibility. Moreover, such sharing would introduce unacceptable risks that the non-aviation equipment might be operated outside the agreed time of operation thus prejudicing safety critical aviation operations.

NATS has also identified a number of errors in Annex C where bands are identified as aviation, perhaps on the basis of band allocations rather than UK aviation usage.
1610 – 1626.5 MHz is predominately used for the mobile satellite service.
5150 – 5250 MHz is used for wireless LANS.

As a related comment, RNSS – satellite navigation systems (GPS / Galileo / Glonass) should not be considered as "aviation" systems. Although aviation may make use of satellite navigation, it will not be a major user when compared to other sectors such as road transport.

Public Sector Spectrum: acquisition and trading

3. It is NATS view that in the longer timeframe of approximately 2020+, the amount of spectrum used for aeronautical ground based navigation and radars will be significantly reduced for en-route applications due to the introduction of automatic dependence surveillance (ADS) systems and satellite based navigation (GNSS). There is however likely to be an increase in communications spectrum requirements since under the strict definitions of the ITU ADS and GNSS augmentation systems are classified as communications and not navigation.

5. From NATS' experience of Ofcom since its creation, we believe that Ofcom at a policy level has very little understanding of how the aviation industry uses those bands allocated for aviation radiocommunication services and is concentrating on other sectors which it perceives to be of greater "value" to the UK. It should be noted however, that we would specifically exclude from this comment the dealings between NATS and Ofcom at an operational, i.e. interference management level as we have a close and successful working relationship in those matters.

If Ofcom is to further the role described in the question then we believe that it should take into account the wider benefits, economic and otherwise, of what the aviation sector brings to the UK as a whole rather than focussing solely on the licence fees collected on Ofcom's behalf as appears to be the case from documents that it has published recently. We would wish to explore with Ofcom ways in which to improve this situation.

6. If RSA was to be used as a mechanism for Crown users then we are of the view that any RSA granted to the Crown within bands used for civil aviation purposes should not afford any rights beyond or over those available to civil aviation licensees; other than what would be available under the current (peacetime) arrangements. Furthermore, we understand that RSA can be drafted in such a way as to permit trading or liberalisation/change of use and would specifically expect the terms of any RSA in civil aviation bands to no further than any trading or liberalisation terms that may be available to civil licensees.

Sharing

10. With the existence of a third party intermediary it may be possible to increase sharing between public sector organisations and other public/private sector organisations. The intermediary must however have a sound knowledge both technically and operationally of the systems that are to be protected. This would tend to rule out the use of regulators in the bands used for aviation since there is no overall operational and technical expertise in these organisations.

The role of such an intermediary would be to manage the band as a whole including frequency assignment, sharing studies, issue of licences etc. Additionally where a new system wished to move into an existing band managed by the intermediary it would be the responsibility of the intermediary for ensuring that the existing users remain protected. It would be imperative that the intermediary had a continuous up to date technical and operational knowledge of the users' requirements which can only be brought about through continuous contact.

11. Due to the way in which safety is managed in aviation, existing "safety users" would have to assure themselves through the normal mechanisms for doing so that any potential sharing arrangement will not compromise safe operations. This process will involve UK safety regulators (CAA Safety Regulation Group) and potentially European safety bodies in the future such as EASA.

13. Primary radar systems have characteristics that differ from those in "communications" systems in that they use high power transmitters and sensitive receivers and this has historically made them difficult spectrum sharers for non radar

type systems. In addition the technical differences between radar and communications systems have not been well understood in the radio regulatory world. In the last few years there have been a number of technical groups within CEPT examining the potential for communications systems sharing with primary radar systems used for safety related uses. This work has proved difficult and the separation distances calculated to potentially allow radar and the communications systems to co-exist have been large, of the order of hundreds of kilometres. The mechanics of the necessary co-ordination processes have also proved to be complex with individual co-ordination being required on a case by case basis with a number of week's notice having to be given by the non-radar user. The effect of the high power radar transmissions on the potential incoming service must also be taken into account and this has not always been apparent in the studies of which we have experience.

We note the work being carried out in CEPT and ITU on the subject of bringing statistical considerations into compatibility studies between primary radar and other systems. It appears that this work is being driven by some countries in relation to a specific instance of sharing that has been agreed to internationally and is then being extended to include all radar bands. The work is ongoing and NATS is closely involved as the radar community has concerns that it may reduce the protection for radar systems to an unacceptable level. There also appears to be little support globally for this approach beyond the one or two proponents and we would caution the Audit and Ofcom on placing too much reliance on the approach at this stage.

Anecdotally, we understand that sharing technologies such as Dynamic Frequency Separation (DFS) introduced by communications systems in some radar bands (not used for civil aviation) are proving not to be interacting with the radar systems as the original compatibility studies showed and that interference is being experienced by those radar systems.

Radar

16. It is always in the interest of the air traffic service provider to operate an efficient radar system. From a NATS en-route perspective the radar systems currently being installed are of the latest technology available and therefore there is nothing to be gained from trying to impose additional technical constraints. One particular point to remember is that the radar market is very limited and only a few radar manufacturers exist globally which limits choice for those wishing to purchase radar. It is not felt that the introduction of standards would be beneficial however better co-ordination between radar users may be worth further consideration.

Outside aviation there appears to be a lack of understanding of the requirements for radars. Primary radar systems rely on the basic characteristics of the pulses reflected by the "target" that follow the laws of physics and cannot make use of, for example, bandwidth compression techniques or advanced modulation schemes that are employed by communications systems to reduce their bandwidth requirements. These issues have a direct effect on the radiated bandwidth and receiver requirements of radar systems. It must also be remembered that the radar environment is fairly hostile for other spectrum users given the high radiated powers and very sensitive receivers in the radar systems.

International

20. There are comments to the effect that mandatory international harmonisation will need to continue in the aeronautical sector; in fact it is stated that this is only *likely* that this will happen in the context of Ofcom's work. We would respectfully remind the Audit and Ofcom that the UK is a signatory to the Convention on International Civil Aviation and as such this harmonisation *will* have to continue if the UK is to be able to continue welcoming international flights and enjoying the associated benefit to the UK economy. Work in ICAO supporting this harmonisation is carried out at a working level by individual experts in such a way as to provide the best, safe and operationally efficient outcome for aviation; this is at the core of the ICAO method of working. Any aspects relating to spectrum usage form a part but are not the complete consideration and in the majority of cases this process is not subject to the national co-ordination found the radio regulatory processes managed by Ofcom.

Having implied that such harmonisation should continue, there then appear to be inconsistencies in the emerging issues document in that section 6.9 contains a number of band specific proposals to effectively seek for the UK to go it alone, albeit perhaps in the short term but with a longer term view for Ofcom to seek to influence changes beyond the UK. It is indicating that the Audit is working with the CAA on these issues, for example, studying freeing up 30-40 MHz at the edge of the DME band. Such proposals would be of concern to NATS as they appear to suggest an incomplete understanding of the operation of internationally standardised systems and the effects of the large reuse distances due to the need to protect the operation of airborne receivers within aviation frequency planning. A specific comment would be in relation to the consideration of the 4.2 – 4.4 GHz radio altimeter band. This stands out in the list of bands mentioned as it is self contained on the aircraft and therefore, for non-UK registered aircraft, beyond the immediate purview of the UK to change unilaterally. International action might be started but it would seem to be unlikely that all aircraft flying in UK airspace would have reduced bandwidth in anything other than the very long term. In any event NATS would welcome the opportunity to participate in the Audit's studies as we believe that we would be in a position to bring forward the necessary expertise in the operation of such equipment.