

***WAC Informal Working Group (IWG)-1***

Modifications to NTIA's Preliminary View  
on Agenda Item 1.3 (see WAC/006(13.01.09))

Preparation for ITU Radiocommunication Conferences

**UNITED STATES OF AMERICA  
PRELIMINARY VIEWS ON WRC-11**

**AGENDA ITEM 1.3:** To consider spectrum requirements and possible regulatory actions, including allocations, in order to support the safe operation of unmanned aircraft systems (UAS), based on the results of ITU-R studies, in accordance with Resolution **421 (WRC-07)**

**ISSUE:** The purpose of this agenda item is to identify spectrum requirements and potentially take regulatory actions, including allocations, to support the safe operation of UASs. The ITU-R is studying sharing and compatibility with existing services already having allocations. This agenda item specifically excludes at WRC-11 the allocation of spectrum for radiocommunications related to payloads on aircraft, but invites the ITU-R to study payload radiocommunication requirements.

**BACKGROUND:** Unmanned aircraft systems (UASs) enable the remote piloting of aircraft over short range and significant distances within or out-of-sight of the remote pilot. These flight operations currently take place in segregated airspace, to ensure the safety of the air vehicle and other airspace users.

Administrations expect broad deployment of UASs throughout the airspace structure. As UAS deployment increases, it will be impractical for some users to deploy in segregated airspace. Some UASs will need to integrate with the current airspace users in a safe and seamless manner. To accomplish integration into non-segregated airspace, UASs will require high integrity communications link(s) between the unmanned aircraft (UA) and remote control centers capable of relaying the necessary air traffic control (ATC) messages and flight critical aircraft information. The UAS pilot will need sense and avoid functions for situational awareness.

The ICAO future communications study may be able to identify technologies with some capacity to meet the requirements for command and control (including the relaying of ATC communications). The aeronautical mobile (R) service (AM(R)S) and aeronautical mobile satellite (R) service (AMS(R)S) are the appropriate services to accommodate command and control and ATC radiocommunications. The ITU-R is examining existing AM(R)S and AMS(R)S allocations for suitable bandwidth prior to studying new allocations.

## Command & Control

In non-segregated airspace, the remote pilot must reliably monitor the status of the UA, pass control instructions to their UA, and interact with the appropriate air traffic controllers monitoring airspace within which their UA is flying. A line-of-sight link might provide these capabilities for UA flying and maneuvering in a localized area. A combination of a terrestrial radio and satellite network and could provide these capabilities to UA flying trans-horizon.

## Relay of Air Traffic Control (ATC) Communications

Safe operation of manned or unmanned aircraft depends on ATC communications. Pilots act based on ATC instructions. When the pilot is remote (not in the aircraft) the pilot and ATC must maintain a voice channel to relay information from a radio in the aircraft to the pilot on ground. Early concepts assume that this function, if digitized, could be part of the command and control links.

## Sense and Avoid

The safe flight operation of UA necessitates advanced techniques to detect and track nearby aircraft, terrain, and obstacles to navigation. Unmanned aircraft must avoid these objects in the same manner as manned aircraft. The remote pilot will need to be aware of the environment within which the aircraft is operating, be able to identify the potential threats to the continued safe operation of the aircraft, and take the appropriate action. The radiodetermination service allocations could potentially accommodate the sense and avoid function. The ITU-R is examining existing [Aeronautical Radionavigation Service \(“ARNS”\)](#) allocations for suitable bandwidth prior to studying new ARNS allocations. The UAV industry is studying the suitability of other technologies for sense and avoid.

## Payload

The spectrum requirements to support payload communications are not critical to the safe operation of that aircraft. The ITU-R is developing a report or recommendation on how to address UAS payload requirements.

**U.S. VIEW:** If studies identified in Resolution 421 (WRC-07) support regulatory actions at WRC-11 for the operation of UAS, the United States supports use of existing primary AM(R)S and/or AMS(R)S allocations, or, if necessary, new allocations for these two services to support the command and control (including ATC communications) of UAS in non-segregated airspace. In connection with studies identified in Resolution 421 (WRC-07), related to the sense and avoid function of UAS, the United States supports use of existing primary ARNS allocations, or, if necessary, new radiodetermination service allocations based on the satisfactory results of ITU-R studies, to support the sense and avoid function of UAS in non-segregated airspace. The United States does not support new allocations for the radiocommunication requirements for UAS payloads. The identification of any frequency band within AM(R)S, AMS(R)S and ARNS allocations, or any new frequency band allocation to these AM(R)S, AMS(R)S and

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ARNS services for use by the proposed UAS command and control, sense and avoid functions, must ensure the protection of the other co-primary services in that band, and not unduly constrain use of that band by other co-primary services. Development of related ITU-R Recommendations is also supported.

**Deleted:** (August 27, 2008).