

Submission to ISED on SMSE-016-25: RPAS in 5030-5091 MHz and Commercial Mobile Bands

Executive Summary

Stratodynamics Aviation Inc. welcomes the opportunity to comment on SMSE-016-25, *Consultation on a Policy, Licensing and Technical Framework for Remotely Piloted Aircraft Systems (RPAS) in the 5030-5091 MHz Band and Certain Bands Used to Provide Commercial Mobile Services*. Stratodynamics supports ISED's objective to maximize the economic and social benefits of spectrum by enabling innovative RPAS applications, including safe BVLOS operations in rural and remote areas.

The HiDRON High-Altitude Platform Station (HAPS) RPAS is a fixed-wing, stratospheric aircraft designed to provide persistent "cell-tower-in-the-sky" capability and 5G New Radio (NR) coverage over wide coverage areas. It can support both safe flight command and non-payload communications (CNPC) and commercial mobile payload services to underserved Canadian regions, leveraging 3GPP-compliant 5G NR and hybrid terrestrial/satellite backhaul.

This submission:

- Supports ISED's proposal to explicitly designate the 5030-5091 MHz band for RPAS CNPC, remove obsolete MLS priority, and align with ICAO and ITU-R allocations.
- Recommends a flexible band-plan and dynamic frequency management approach that accommodates both terrestrial and satellite CNPC links, including airborne relay concepts relevant to HAPS.[4][5]
- Supports use of certain commercial mobile bands for RPAS CNPC and payload via aerial UE on 3GPP networks, with appropriate technical requirements and coordination.
- Highlights how HiDRON HAPS 5G can help meet national connectivity objectives, complementing ISED's Spectrum Outlook 2023-2027 and CRTC wholesale roaming reforms by bringing cost-effective coverage to 20-30 underserved regions identified by Stratodynamics.
[6][7][1]

1. About Stratodynamics and the HiDRON HAPS 5G Concept

Stratodynamics Aviation Inc. develops and operates high-altitude RPAS and flight services for earth observation, surveillance, and telecommunications applications. Its HiDRON platforms are fixed-wing stratospheric UAVs that have demonstrated flights above 30 km with precise autonomous navigation and recovery.

The HiDRON HAPS 5G solution uses a cycling fleet of stratospheric aircraft operating roughly 18-21 km altitude, each providing an 80 km target 5G coverage diameter (up to ~200 km with advanced antennas) and serving up to 10,000 mobile subscribers per deployment region. Aircraft carry a modular 5G NR payload and maintain connectivity to a ground node via terrestrial or satellite backhaul; by cycling aircraft up and down for recharge, the fleet provides persistent coverage despite Northern latitude solar limitations.

2. Support for Designating 5030-5091 MHz for RPAS CNPC (Q1–Q2)

Stratodynamics supports ISED's proposal to add a new Canadian footnote **CXX** in the Canadian Table of Frequency Allocations, designating the 5030-5091 MHz band under AM(R)S and AMS(R)S specifically for RPAS CNPC, and to suppress footnote 5.444 that reserves the band for microwave landing system (MLS) priority, which is not deployed in Canada.

Internationally, WRC-12 added primary AM(R)S and AMS(R)S allocations in 5030-5091 MHz for RPAS, and ICAO's Frequency Spectrum Management Panel has developed SARPs and a draft band plan for terrestrial and satellite RPAS C2 links in this band. The band is globally harmonized and underutilized in Canada because MLS has been superseded by GNSS-based approaches, making it an excellent candidate for safety-critical CNPC.[5][4]

The proposed CXX footnote appropriately confines use to CNPC-type applications (aircraft control, ATC relay, detect-and-avoid data, weather radar, operational video, on-board system monitoring) consistent with AM(R)S/AMS(R)S safety-of-flight purposes. Stratodynamics does not propose adding non-CNPC payload services in this band and agrees that high-throughput payload communications should instead use commercial mobile or other non-aeronautical allocations.

3. Band Plan for 5030-5091 MHz (Q3–Q4)

Stratodynamics agrees that maximizing harmonization with ICAO and ITU-R arrangements while preserving flexibility is key, and therefore favours a high-level band plan compatible with both the ICAO concept and evolving U.S. arrangements (FCC NNA/NSS).[4]

ICAO proposes terrestrial RLOS CNPC in 5040-5080 MHz and satellite CNPC in 5030-5050 and 5070-5091 MHz, while the FCC NPRM and subsequent Report and Order focus initially on 5040-5060 MHz for non-networked access, with a Dynamic Frequency Management System and interim access mechanism. Given the lack of global consensus on exact sub-band placements, Stratodynamics recommends that ISED:[9][4]

- Adopt a **band-plan envelope** that explicitly accommodates terrestrially-based CNPC, satellite-based CNPC, and airborne relay CNPC solutions in line with ICAO/RTCA standards, rather than hard-coding a fully granular channelization at this stage.
- Preserve the possibility of **airborne relay CNPC links** (e.g., HAPS acting as a CNPC relay between RPA and ground infrastructure) as identified in ICAO work, recognizing that some RPAS concepts (including stratospheric platforms) may require CNPC links to or via high-altitude aircraft.[4]

Stratodynamics suggests that any Canadian band plan should:

- Reserve contiguous spectrum sufficient for terrestrial CNPC networks supporting large numbers of RPA, akin to FCC's NSS concept, to enable network-based CNPC and potentially allow future integration with aviation ATN/IPS.
- Reserve spectrum segments suitable for satellite CNPC and allow for aircraft earth station operation in both directions, as envisioned in ITU-R M.2171 and ICAO material.[4]
- Include provisions or guidance for **airborne relay CNPC** within the same band, enabling future architectures where HiDRON-type HAPS provide RLoS CNPC coverage to lower-altitude RPAS fleets in remote regions while maintaining CNPC connectivity via terrestrial or satellite links.

5. Technical Requirements and Coexistence in 5030-5091 MHz (Q9–Q13)

Stratodynamics supports ISED's proposal to base technical requirements on RTCA DO-362A MOPS, including channelization, maximum EIRP, out-of-band emission limits, frequency stability, and time-division duplexing constraints. Harmonization with DO-362A and related ICAO/RTCA standards is essential for equipment availability and cross-border operations.

Stratodynamics agrees that protecting the Dominion Radio Astrophysical Observatory (DRAO) via an exclusion zone for CNPC operations in 5030-5091 MHz is appropriate, mirroring protections in adjacent bands. Given that MLS is not deployed in Canada and that there are no fixed satellite service allocations in this band domestically, Stratodynamics concurs that additional MLS- or FSS-specific measures are unnecessary beyond international ITU-R requirements.

In addition, Stratodynamics recommends that ISED:

- Encourage or require CNPC networks (including any HAPS-based CNPC relays) to implement adaptive power control to minimize interference footprint, which is feasible for HiDRON-class platforms and precise station-keeping.
- Consider adopting an approach similar to the FCC's Dynamic Frequency Management System (DFMS) for assigning CNPC channels in 5030-5091 MHz, which would be particularly beneficial where multiple RPAS operators, including HAPS, share airspace and spectrum.[9]

7. Use of Commercial Mobile Bands for RPAS CNPC and Payload (Q21–Q27)

Stratodynamics strongly supports ISED's proposal to permit use of certain commercial mobile bands by RPAS via aerial UE for CNPC and payload, leveraging existing LTE/5G NR networks. This aligns with growing international practice (e.g., ECC Report 318, UK aerial UE licensing) and reflects Canadian mobile network ubiquity.[10]

The criteria proposed by ISED—existing mobile allocations without “except aeronautical mobile” exclusions, robust ecosystem, and manageable interference environment—are appropriate. The initial bands identified (600 MHz, 700 MHz, AWS-1, AWS-3, PCS) are well-chosen because they are widely deployed, support 3GPP-standardized aerial UE features, and provide a mix of coverage and capacity.[7]

Stratodynamics supports adding a Canadian footnote (CYY) to the CTFA that clarifies aerial UE may be used for RPAS CNPC and payload in these commercial mobile bands under the mobile allocation. Stratodynamics also supports removing the explicit prohibition on RPAS use from the PCS Access Licensing framework, and allowing supplemental mobile coverage by satellite (SMCS) in these bands to support aerial UE and RPAS in rural/remote areas, consistent with ISED's decisions on SMCS.[8]

From the HiDRON perspective, enabling aerial UE in these bands allows the HAPS platform to:

- Act as a 5G NR base station providing service to user equipment in underserved areas using bands such as 600 MHz, 3.5 GHz and 28 GHz (for higher-capacity overlays), with backhaul via fibre, microwave, or satellite.
- Potentially use commercial mobile bands for its own CNPC and telemetry where safety considerations and aviation regulations permit, particularly in lower-risk operations and transitional phases.

8. Licensing Model and Conditions in Commercial Mobile Bands (Q28–Q30)

Stratodynamics agrees that RPAS communications in commercial mobile bands should be authorized under existing spectrum licences held by mobile network operators, with RPAS operators acting as subscribers or enterprise customers under commercial agreements. No separate RPAS-specific spectrum licences are necessary, provided licence conditions are updated to explicitly permit aerial UE and RPAS use.

This model correctly places responsibility for network planning, interference management, and compliance with technical rules on licensees that already operate the networks. Stratodynamics supports ISED's proposal to manage RPAS use in these bands through licence conditions and new Radio Standards Specifications (RSS) for aerial UE, rather than through separate SRSPs dedicated solely to RPAS.

Stratodynamics also supports extending SMCS generic earth station licences to cover aerial UE on RPAS that connect via satellite components of mobile/fixed communications networks, under conditions ISED has already established for SMCS in flexible-use bands. This is particularly relevant for HiDRON HAPS, which may use satellite backhaul in addition to terrestrial backhaul to integrate into national mobile networks.[8]

9. Technical and Coexistence Considerations in Commercial Mobile Bands (Q31–Q38)

ISED proposes to rely primarily on existing SRSP technical limits for base stations (pfd/field-strength constraints at service-area boundaries) and to develop new RSS requirements for aerial UE (e.g., maximum EIRP, height-dependent power control, out-of-band emission limits, in-band emission masks). Stratodynamics agrees with this approach and believes that 3GPP standards for aerial UE can largely be adopted or adapted.

Stratodynamics notes that studies cited by ISED and international bodies indicate that aerial UE at typical RPAS altitudes (hundreds of metres to a few kilometres) may increase inter-cell interference but can be managed through network configuration, power control, and scheduling. For HiDRON-class HAPS, which operate at 18-21 km and function as base

stations rather than ordinary UE, interference management will rely on careful antenna design, and coordination with terrestrial networks, all of which are integral to the HiDRON system architecture.[11]

Regarding coexistence with adjacent services—public safety broadband, fixed links, meteorological satellite, and radio astronomy—Stratodynamics supports ISED’s conclusion that existing SRSP protections and international coordination rules remain largely sufficient. Stratodynamics recommends that ISED ensure any new aerial-UE RSS include specific protections for RAS in relevant bands, consistent with ECC and ITU-R guidance.[12]

10. Alignment with Canadian Connectivity and Industrial Policy Objectives

The proposed frameworks for RPAS CNPC in 5030-5091 MHz and RPAS use of commercial mobile bands directly support broader Canadian connectivity and industrial policy objectives set out in the Spectrum Outlook 2023-2027 and CRTC decisions on wholesale roaming and MVNO frameworks.[6][7]

Stratodynamics’ analysis identifies 20-30 Canadian regions where populations greater than 10,000 within an 80 km diameter lack adequate mobile coverage. For these regions, the HiDRON HAPS 5G solution offers over four times the coverage area of a typical rural tower, roughly 50% lower CAPEX per covered area, and significantly lower latency than satellite-only solutions, making it an efficient tool to meet CRTC universal service objectives.[6]

The 5030-5091 MHz CNPC framework would allow Stratodynamics to operate HiDRON HAPS safely in controlled airspace with robust CNPC links, while use of commercial mobile and SMCS bands would enable 5G NR payload services that integrate seamlessly with national carrier networks. This combination supports new business models such as wholesale roaming coverage and access in underserved regions and dedicated slices for emergency response, industrial IoT, and Indigenous community networks.[8]

11. Specific Recommendations and Responses to Key Questions

In summary, Stratodynamics respectfully submits the following key positions in response to ISED’s questions:

- **Q1–Q2 (CTFA and CNPC scope):** Support adding footnote CXX designating 5030-5091 MHz for RPAS CNPC under AM(R)S/AMS(R)S and suppressing MLS priority footnote 5.444; no additional non-CNPC applications are recommended in this band.
- **Q3–Q4 (Band plan):** Recommend a flexible band-plan envelope compatible with both ICAO and evolving U.S. arrangements, explicitly accommodating terrestrial, satellite, and airborne relay CNPC operations.[4]
- **Q9–Q13 (Technical & coexistence):** Support adoption of RTCA DO-362A-based technical limits, and no additional FSS-specific measures; recommend encouraging adaptive power control and directional antennas and progressing toward DFMS for CNPC assignments.[9]

- **Q21–Q27 (Commercial mobile bands):** Support criteria and initial bands (600, 700, AWS-1, AWS-3, PCS), adding CTFA footnote CYY to permit aerial UE for CNPC/payload, and removing RPAS prohibitions from PCS Access Licensing; support enabling SMCS in these bands for RPAS.[8]
- **Q28–Q30 (Licensing in mobile bands):** Support authorizing RPAS use under existing mobile spectrum licences with updated conditions and dedicated aerial-UE RSS; support extending SMCS generic earth station licences to RPAS aerial UE.
- **Q31–Q38 (Technical & coexistence in mobile bands):** Support relying on existing SRSP limits and new aerial-UE RSS aligned with 3GPP standards, plus targeted protections for RAS and other sensitive services; note that HAPS base-station operation will depend on careful antenna design and coordination with terrestrial networks.

Stratodynamics would welcome the opportunity to participate in any future ISED or multi-stakeholder working groups on RPAS CNPC band planning, DFMS design, and the integration of HAPS into Canada’s aviation and telecommunications frameworks.

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