**Before the**
**Federal Communications Commission**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
| | ) | |
| The 4.9 GHz Band Transferred | ) | WT Docket No. 00-32 |
| From Federal Government Use | ) | |
| Spread Spectrum Devices | ) | |

**Reply Comments**
(Late-Filed Ex Parte)[1]

Warren C. Havens ("Havens") and Telesaurus Holdings GB, LLC ("Telesaurus") (in which Havens holds majority controlling interest) (together, "LMS Wireless," their DBA ["LMSW"]), hold the majority of the LMS Multilateration ("LMS-M") 'A'-block licenses in the nation.[2] This block is 6 MHz of the 902-928 MHz band.

LMSW hereby submits reply comments in the above captioned proceeding regarding the 4940-4990 MHz ("4.9 GHz") band.[3]

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[1] As described herein, these Reply Comments are based on the LMSW ATLIS white paper. LMSW had not sufficiently completed work on this white paper, which is centered around the 902-928 MHz band (in which LMWS holds spectrum) in time for filing Reply Comments by the filing deadline. It is thus filing these on an Ex Parte basis.

[2] Havens also holds licenses in the VHF-VPC (157/162 MHz), AMTS (217-220 MHz), and 220-222 MHz services in many areas of the nation.

[3] *The 4.9 GHz Band Transferred from Federal Government Use, WT Docket No 00-32, Second Report and Order and Further Notice of Proposed Rulemaking, FCC 02-47* (rel. February 27, 2002) *("Second R&O & FNPRM").*

Contents

## Summary

LMSW herein proposes that the 4.9 GHz band be allocated in part to Public Safety ("PS") and Critical Infrastructure ("CI") entities, and in part to for-profit private enterprise ("PE") entities. This will facilitate the building and operating of virtual private networks in shared physical networks for major cost efficiencies and other benefits.

One such benefit would be use by PS in emergencies of all of the PE capacity on the shared networks via priority access. To have this capacity without this arrangement could be cost prohibitive. To not have it is jeopardizing national security.

The PE spectrum would be sold at auction, via percent-of-yearly-operating-results bids, with proceeds going to PS to help fund its network costs. PS and PE interests are then aligned to succeed in the shared networks.

Any uses of the spectrum would be permitted, including for point-to-point network backhaul.

When deciding upon 4.9 GHz licensing, the 75-MHz-wide 5.9 GHz band should be considered for similar licensing, uses, and shared networks among PS, CI, and PE, in addition to the currently intended uses involving hot-spot Dedicated Short-Range Communications along roadways and roadsides.

LMWS proposes the above as a component of its larger proposal, called ATLIS, for exclusive, coordinated PS, CI, and PE allocations in the 902-928 MHz, 4.9 GHz, and 217-225 MHz bands, providing for shared networks and public-private synergies. Upon a close examination, most of the spectrum in the noted 900 and 200 MHz bands do not have substantial current encumbrance, and are thus available via appropriate rule changes.

The demands of current communications applications and technology, due to their

increasing complexity, magnitude, and cost, increasingly call for (i) larger higher-capacity networks thus either major public-access networks, or as per the ATLIS proposal, major non-public networks shared by multiple entities in secure VPN mode, and (ii) multiple bands that are, as in the ATLIS plan, in frequency and amount suitable for the various types of coverage involved (rural to urban, WAN to PAN) and applications involved (simple voice and latency-tolerant data such as email, to high-speed streaming media). These must be coordinated in networks for effective and secure implementation, especially for mission-critical communications.

The proposed ATLIS networks would also serve a host of Intelligent Transportation System functions, many essential for national productivity and security, as well as cost-effective environmental monitoring, also sorely needed. They also could be ideal test beds and users of DARPA XG (a "4G" wireless) technology, for its intrinsic value and to help the US gain ground verses Europe and Asia in wireless technology and implementation.

The above proposals would implement key priorities of the Commission, Chairman Powell, and the Spectrum Task Force, as well as PS and CI, regarding "Interoperability," "Homeland Security," spectrum availability for PS and CI, spectrum efficiencies, advanced applications and technologies (which need major new spectrum to deploy), and public sector/private sector cooperation regarding these priorities.

Public Safety ("PS"), Critical Infrastructure ("CI"),
and Private Enterprise ("PE") Should Each Be Licensees in 4.9 GHz,
and Build and Operate VPN's in Shared Networks for Multiple Synergies

LMSW agrees in large part with the Reply Comments in this proceeding of the Untited Telcom Council ("UTC") including that Critical Infrastructure ("CI") entities as described in Section 309(j)(2) of the Communications Act be eligible as licensees in and users of the 4.9 GHz band, and that CI and public safety ("PS") entities be encouraged to jointly build and operate systems with this spectrum. However, LMSW believes that appropriate implementation of the following Commission interest is essential to the best use of this band, including for PS and CI interests:

> "[W]e are also interested in exploring innovative and non-traditional means of employing public safety use of the band. A possible approach would be to allow commercial use in support of public safety in this band. For example, we could allow commercial licensees to utilize the band in order to serve public safety entities. We ask commenters to provide specific information on how such an approach could be implemented . . . ."[4]

It is forward-thinking and wise for the Commission to propose and pursue this interest. In accordance therewith, LMSW, as a component of its larger multi-band "ATLIS" proposal outlined below, proposes that this 4.9 GHz band also be licensed (in addition to PS and CI) to for-profit entities (herein, "Private Enterprise" or "PE") on the condition that they build and operate systems jointly with CI and/or PS licensees, in large part using system infrastructure of PS and CI (antenna sites, backhaul, etc.), and provide to them priority access (other terms described below) for large additional capacity reserves. Within such shared networks, PS, CI, and PE would each have secure virtual private networks ("VPN's"), interoperable as desired. On their respective VPN's, PE could provide lease system capacity or provide services to any

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[4] *Second R&O & FNPRM*, ¶36.

entity, including PS and CI, and PS and CI could lease excess capacity to PE or any private radio user, maintaining priority use.

PE could serve other "critical" infrastructure and industries than those described in §309(j)(2) of the Communications Act, and various other business enterprises, and could provide additional capacity to PS and CI.[5] Further, PE could undertake roles that PS could not undertake, practically or under law, which would result in clear public safety benefits for day to day operations and emergencies, including certain means to connect PS and public wireless in emergencies: see Attachment 1, Exhibit 3.

LMSW believes such an arrangement would lead to major improvements in the speed of development, quantity and quality, and costs of technology, applications, and systems in this band. PS and CI have valuable infrastructure needed for major new wireless (antenna sites, backhaul, etc.) and provide a stable long-term market for new wireless (technology, equipment, applications, services, etc.). The private-enterprise wireless market is more cyclical and yet larger and more aggressive in terms of innovation and cost efficiencies. Together, PS, CI, and PE can, per the LMSW proposal, achieve synergies by drawing on their respective strengths and combining to create a larger, more-stable market and more cost-

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[5] Herein, by "Critical Infrastructure" ("CI"), we mean entities described in Section 309(j)(2) of the Communications Act (the "Act"), and by "Public Safety" ("PS") we mean traditional public safety as described in Section 337(f) of the Act. We note, however, that other parties have suggested that other entities also have need for more spectrum and also are critical to the nation's security and economy. See.e.g., *FCC Staff Report on NTIA'S Study of Current and Future Spectrum se by the Energy, Water, and Railroad Industries Submitted Pursuant to Public Law No. 106-553*, July 30, 2002, footnote 4, citing ITA and ARINC. Entities involved with highway transport may also make such claim, and both the FCC and Congress have recognized the critical value of Intelligent Transportation Systems. Accordingly, herein, LMSW suggests that the proposed portion of the 4.9 GHz band that would be licensed to PE (subject to their relationship to PS and CI as described herein) could be used to serve these other entities, along with business enterprises in general which need advanced mission-critical wireless communications.

efficient networks for mission-critical wireless.

PS and CI are conservative regarding new technologies and services including wireless. Commercial (for profit) wireless is more aggressive, acting with more speed and risk to develop for a much larger market advanced technologies and systems.[6] These days, using digital technology with end to end encryption (see preceding footnote _), VPN's are clearly possible and secure. Also, implementing new digital wireless networks, with spectrum-efficiencies and advanced security and applications, especially for integrated mobile and fixed applications as per the ATLIS proposal, is expensive and requires a large volume of traffic to justify the cost, more traffic than individual or small consortiums of PS and CI generate. In this regard, the for-profit wireless sector, even only its private wireless component (i.e., excluding public-access wireless), is many times that of PS and CI

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[6] Despite the major resources and clear need of PS and CI, most PS and CI wireless systems are still "first-generation" analog systems that are not spectrum efficient or inherently secure, nor lend themselves to shared systems where the sharing parties can have respective control yet interoperability as desired. (Newer systems that are fully digital with end-to-end encryption security can provide this, as via Tetrapol-based systems for mission-critical professional mobile radio.) Commercial (for profit) wireless has pulled far ahead of private wireless used by PS and CI for the last several decades in quantity and variety, quality and features (at least per cost), etc. Compare the "average" commercial wireless user in developed nations (using GMS 2G, 2.5G, and 3G digital technology) verses the "average" CI or PS wireless users with 10- to 20- year old analog technology. Regarding high-speed data wireless, apart from 3G mobile wireless, various fixed wireless is also rapidly developing including the various 802.11 technologies.

The current DARPA "XG" wireless technology project should be supported and looked to for technology for major new bands, especially for PS and CI. Its goals include development of 4$^{th}$ generation technology for both commercial and military mission-critical needs, and technology that optimizes spectrum efficiencies and sharing of bands among various users and classes of service. Where, as with this 4.9 GHz band, there is a major new band not encumbered by need to migrate from legacy systems, nor to rush time to market for return on investment, the DARPA XG-derived technology may be especially appropriate. LMSW understands that the FCC Spectrum Task Force is familiar with this DARPA project and shares some of its goals. LMSW has proposed to the XG project managers to consider the spectrum in the ATLIS Proposal as a testbed and potential home for XG technology.

combined.[7] Further, new technology and systems for PS and CI (and other private wireless) derive largely from developments coming out of commercial wireless. Accordingly, the more PS, CI, and PE share —per appropriate arrangements as suggested herein— spectrum bands and networks using such advancements, the more PS and CI will keep up with and obtain the most benefits form the larger markets and more aggressive development of commercial wireless. Thus, as proposed herein, PS and CI should form larger consortiums for new wireless and include PE as well, with a design—supported by appropriate FCC licensing rules—for PE to support PS and CI. PE, in turn, will obtain fair benefits not obtainable if operating separate from PS and CI.

This approach is consistent with the Commission's recommendations in its recent report on spectrum for the Energy, Water, and Railroad Industries.

> . . . The designated industries are encouraged to continue to migrate to more efficient technologies and to make use of available commercial spectrum services when practicable, including terrestrial wireless and satellite services, as well as civil satellite services. They are also encouraged to utilize new methods of sharing and licensing to meet their needs, to ensure that efficient and effective use of spectrum is achieved.[8]

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[7] The Strategis Group estimated in 1999 that there are approximately 16 million private radio users, including PS, CI, and all other segments. Of this, approximately 10% was public safety (as defined by Strategis), 13% State and local government, 4% utilities, 6% transportation, 61% "businesses," and 6% other. *(Private Radio Markets & User Trends: 1999.)* Strategis did not project substantial growth relative to CMRS. However, it did not in this report consider Telemetry and similar "machine to machine" data communications which is growing rapidly, and other new services and technologies needed in private wireless that should contribute to substantial growth. It also did not consider the stimulus that a major intiative such as ATLIS would have to spur growth: especially growth in total traffic (amount of wireless voice and data transmitted) but also in terms of wireless devices in use in private systems.

[8] *FCC Staff Report on NTIA'S Study of Current and Future Spectrum use by the Energy, Water, and Railroad Industries Submitted Pursuant to Public Law No. 106-553*, July 30, 2002, Conclusion section. Also, in "Options for Upgrading Utility Wireless Networks," a study by KPMG for UTC released by UTC on or about July 23, 2002 (summary presented by KPMG at the UTC annual meeting in June 2002), a key recommendation is for CI entities to jointly build and share new digital wireless networks among themselves and with PS entities.

These LMSW suggestions are based on a specific proposal recently outlined to the FCC, NITA, and CI and PS communities. Called "ATLIS" ("Advanced Technology Land Infrastructure and Security Service"), a Summary of which is provided in Attachment 1 hereto. This ATLIS proposal would provide for CI and PS 13 MHz of exclusive spectrum in the 902-928 MHz range at no cost, emergency priority access to the remaining 13 MHz in this range (and if desired, fair-market-rate access to this additional 13 MHz for day-to-day use), for wide-area mobile systems, interoperability, new digital '4G' technology and applications, and a host of Homeland Security functions. Combined with similar licensing and network sharing in the 4.9 GHz band (and, as noted below, supplemented as well by a similar arrangements in the 217-225 MHz band and the 5.9 GHz band), the proposal presents a comprehensive approach for solving much of the unsatisfied wireless needs of PS and CI, and providing complementary PE mission-critical wireless for many other critical industries and enterprises, as well as special applications providing major public safety and resource-protection benefits nationwide (see Exhibit 3 to Attachment 1 hereto).

While wireless technology has advanced greatly in the past decades, there has not been a concomitant level of advancement in spectrum planning, and based largely thereupon, network design and deployment. After "9-11" it is evident and widely discussed that the nation must pursue a more creative proactive longer-range plan for the communication functions of PS and CI. This should involve an approach along the lines of the ATLIS plan, which proposes allocation of a multi-band PS/CI- oriented service, with associated supportive PS mission-critical component, appropriate for integrated mobile and fixed wireless in urban

and rural areas.[9]

In this regard, while in more densely and uniformly populated areas such as Western Europe and the Far East, one spectrum band (such as 900 MHz GSM) may suffice for cost effective coverage (at least for mobile networks), no single band is the best choice for coverage of the United States or any large region thereof, which involve far greater percentages of rural and suburban areas. These areas can only be covered cost effectively and quickly via lower-range spectrum such as a good portion of the 217-225 MHz band due to its longer-range propagation. Likewise, a band such as 4.9 GHz (and the 5.9 GHz band noted herein), due to its shorter-range propagation and high bandwidth per coverage range, is needed for high-speed data applications in high-traffic "hot spots," and localized applications and point-to-point applications.[10] For these respective needs, LSMW proposes these two bands in its ATLIS plan.

As described below, this ATLIS plan proposes 13 MHz in the 902-928 MHz band for exclusive use by PS and CI, with PE already licensed for the other 13 MHz: this 900 MHz range is ideal for mobile coverage in the urban areas and high-traffic corridors, as shown by

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[9] Mobile satellite service ("MSS") would, logically, also be a valuable component for basic voice and lower-rate data coverage (i) in the more remote areas, (ii) areas for which terrestrial coverage has not yet been achieved, (iii) redundancy, and (iv) possibly for certain asymmetrical lower-rate data applications such as wide-area tracking of assets (or tracking/ monitoring of persons, or radio- equipped wildlife) with the MSS used for very wide area broadcast of polling and other instructions, and the terrestrial systems used for individualized responses. This would in most cases involve inclusion of one or more MSS radio transceiver or receiver in the end-user devices along with the terrestrial spectrum trancseciver. MSS operators (such as Globalstar and Iridium) having substantially reduced expectations of penetration of the broad public-access market (terrestrial wireless is too competitive and quick moving) are clearly seeking major opportunities such as this would present.

[10] Localized applications could include indoor and premises LAN's, whether high-traffic or not, and point-to-point applications could include network functions (primary and hot-

the success of 800 MHz and lower 900 MHz for cellular and GSM worldwide. These three spectrum ranges (200, 900, and 4900 MHz) together provide an ideal combination for cost effective coverage, and the quantities involved in each range (respectively, approximately 9, 26, and 50 MHz) are also appropriate for the respective applications and levels of traffic each would support for the proposed use by PS, CI, and PE. Cost-effective multi-band end-user devices[11] would be employed for many applications and users, but not all.[12]

Along the lines of the above, the Commission commented on the complementary

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standby-backup backhaul to switches and nodes, and inter-site connections for group and individual calls).

[11] At least for a second-generation technology and equipment in the proposed multi-band service, a more comprehensive approach should be warranted, where the multiple bands involved are in operation in most areas (of a particular wide area network) and most end-user devices are capable of operating on such multiple bands. Radios with multi-band capability (whether largely software-defined or not), in sufficient quantity, as should result under the ATLIS proposal, would not be substantially more expensive than single band radios. E.g., consider the two- and three-band CMRS radios that are popular around the world verses comparable single-band units. Also, where such multiple bands serve not only to provide more cost effective coverage for an application such as traditional voice, but also to provide enhanced or additional applications [such as high-speed data for streaming video, etc.], these benefits must be factored into an assessment of the cost of such multi-band radios verses single-band units. Rather, cost per radio is not as relevant as broader measures of cost per needed capability delivered. Further, as reflected in the text below, the cost of radios is also related to the cost of components for the spectrum involved, and in this regard, the 902-928 MHz band has major advantages over the 700 MHz band or any other band suitable for wide-area mobile service due to it being in spectrum range which has the greatest volume of traffic, radios, and components in the world for wireless communications.

[12] For example, radios capable of operating on both the 902-928 MHz range, and the 4.9 GHz range, or these and the other two bands proposed in the ATLIS plan (217-225 MHz and the ITS 5.9 GHz). One recent example demonstrating commercial feasibility (cost effective in quantities) is that Qualcomm reports development for cell phones of chips that will operate on Wi-Fi systems (in the 2.4 GHz unlicensed band) (from CITA electronic Daily News, 7-30-02, citing CNET News.com as source). Similarly, ATLIS radios could operate on the sub-GHz wide-area spectrum (200 and 900 MHz), and the higher "hot-spot" spectrum (4.9 and 5.9 GHz). As noted in footnote __ above, integration of MSS capability should also be considered in some cases.

strengths of multiple bands in this proceeding, in the *Second R&O & FNPRM,* ¶26, where the complementary strengths of the 700 MHz spectrum and the 4.9 GHz band were discussed. However, while the suggested use of 700 MHz (for wide area mobile) to complement 4.9 GHz (for "hot-spot" high-data-rate fixed and mobile) is not practical at this time or in the foreseeable future (see below), the ATLIS proposal is: ATLIS proposes 902-928 MHz for the principal wide-area mobile spectrum, half exclusively for PS and CI, and the rest for PE but with priority access to PS and CI.[13] Despite appearances, the 26 MHz in 902-926 MHz is available now with only slight encumbrances which can be removed or mitigated.[14] (The availability of 217-225 MHz is discussed in footnote _ below.)

In comparison, (i) the 700 MHz PS allocation and Guard Band allocations are heavily encumbered by TV station operations which do not have to relinquish use of the spectrum for an uncertain number of years to come, with very strong lobbies protecting these TV interests, (ii) the PS allocation is not available for CI entities (as defined herein, per §309(j)(2) of the Act) and thus the concept of sharing by PS and CI suggested by the Commission in the *Second R&O & FNPRM*, and proposed under ATLIS,[15] could not be achieved, and (iii) the 700 MHz Guard Band is not suitable for wide-area mobile systems, due to restrictions including prohibition of cellular-like architecture. Nor is it sufficient spectrum for larger-scale PS, CI, and PE networks which could achieve the synergies and economies feasible under the

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[13] In any case, there is no reason that PS cannot use both 700 MHz and this 900 MHz in conjunction with 4.9 GHz.

[14] See Summary ATLIS white paper, Attachment 1.

[15] As noted in a preceding footnote, this is also proposed as well for the CI industry in "Options for Upgrading Utility Wireless Networks" a study by KPMG for UTC, released by UTC on or about July 23, 2002 (summary presented by KPMG at the UTC annual meeting in June 2002). A key recommendation of this study is for CI entities to share new wireless

ATLIS plan based on 26 MHz of mobile spectrum.

Further, 902-928 MHz is in the range of the most used spectrum in the world for wireless services: GSM 900 MHz, cellular and land mobile 800 MHz and 900 MHz, and this will allow for use of existing and adapted technology and components developed for these predominant services for the proposed PS/CI/PE mission-critical wireless in the 902-928 MHz band. This is discussed and documented in Attachment 1. There is no similar major advantage in the 700 MHz spectrum.

Spectrum Allocation Split in 4.9 GHz Between
Public Safety, Critical Infrastructure, and Private Enterprise
(within the context of the LMSW plan)

Regarding the split between PS, CI, and PE in 4.9 GHz under the concept we propose herein, we propose that one-half be allocated to PE. This would be the same amount as in the 902-928 MHz band, and the 217-225 MHz band under this plan (see Attachment 1). PE needs sufficient spectrum for its role, including development of priority access capacity for emergencies, to be effective. We propose a similar spectrum split and licensing arrangements as proposed herein (including below) be established for the 75-MHz-wide ITS 5.9 GHz band.[16] This would give PS and CI additional spectrum for the same applications as 4.9 GHz would serve, if, as we propose, both these of these relatively close bands are used for many if not all same applications.

Uses of 4.9 GHz
(within the context of the LMSW plan)

Regarding uses of the 4.9 GHz band that should be permitted, under the overall plan

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systems among themselves and with PS entities.

[16] This 5.9 GHz band is discussed on page __ below. LMSW (Havens and Telesaurus) submitted suggestions similar to those herein on licensing in this 5.9 GHz band in

LMSW suggests herein (the ATLIS multi-band plan for PS, CI, and PE, or a similar approach to 4.9 GHz by itself, as well as the licensing coordination method proposed below), LMSW proposes that any use be permitted,[17] including (i) the "hot spot" and "broadband" applications discussed in the *Second R&O & FNPRM in this proceeding,* other local-area applications such as premises LAN's, whether high-traffic or not, and point-to-point applications including network-operation functions (e.g., primary and hot-standby-backup backhaul to switches and nodes, and inter-site connections for group and individual calls), and services to end-user entities such as linking dispatch centers to the network.

Licensing Methods for 4.9 GHz
(within the context of the LMSW plan)

Regarding licensing methods for 4.9 GHz[18] in the context of this overall LMSW plan proposed herein for 4.9 GHz: (i) Regarding coordination of licensing among PS, and for dealings with CI and PE with respect to the proposed dealings (shared networks for VPN's, etc.), we suggest that, given the nationwide scope of the ATLIS proposal, its roles to advance Homeland Security goals (more wireless interoperability, capacity, and capabilities, etc.), and the proposed inclusion of Federal PS use,[19] an appropriate Federal government office involved with Homeland Security nationwide should have top-level authority (herein, the "PS Coordinator"). One purpose of the Federal Homeland Security initiatives is to have a means of coordinating Federal, State, and local programs and action for public safety, and doing so for

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17 LMSW suggests the same regarding the other bands in the ATLIS plan.

18 LMSW suggests the same regarding the other bands in the ATLIS plan.

19 And related thereto, the proposed "contribution" of the Federal government of certain existing but little used priority use rights in 902-928 MHz: see below section "The ATLIS Proposal" which describes these rights and the proposed relinquishing thereof to enable non-Federal PS and CI to use the spectrum.

the proposed ATLIS plan makes sense.

Regarding coordination of licensing among CI, and for dealings with PS and PE with respect to the proposed dealings (shared networks for VPN's, etc.), we would leave that to the CI associations including UTC to suggest. In any case, we strongly suggest that there be only one, a CI Coordinator (see next footnote).

Regarding licensing PE, LMSW suggests competitive bidding for one nationwide license,[20] with opening minimums paid in cash (upon acceptance of the long-form application

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[20] The ATLIS concept is mission-critical communications to serve interoperable PS and CI nationwide, with the PE component designed to support and give priority to these directly and indirectly. This calls for the efficiencies that would result from there being one nationwide PE license, even if more PE licenses would create more bidding competition (and it is not clear that it would). Under the ATLIS proposal, the PS component would have on nationwide PS Coordinator (see footnote __ above) and the CI component would, we suggest, have one Coordinator also. Similarly, the PE component should be one entity for the ATLIS plan to be most effective: a number of PE licensees would greatly complicate and encumber the necessary cooperation between PS, CI, and PE. The ATLIS plan's goal is to structure and promote a major nationwide service, with regional component networks which would increasingly be integrated or substantially interconnected. Various participating PS and CI entities, as well as entities which PE would serve, have various service areas in which they need wireless service: these are not uniform among PS and CI and probably cannot be currently determined: These need neutral nationwide coordinators. PS and CI would have to define networks, including their geographic areas, but such decision may take a good while after FCC PE licensing decisions, and may be subsequently change from time to time. If the essential PE component is not also nationwide, based on a nationwide license, it would be much harder to fulfill the goals of efficient shared networks. For example, if PE licensing was based on REAG's (as in the 220 MHz auctions) and each license was bought by different entity, and if PS and/or CI decided to build a network that would have coverage extending across portions of three PE license regions, then the PE component of that shared network would involve three PE licensees and this would create major additional complications regarding the PE component than if there was only one nationwide PE licensee. Similarly, one reason the ATLIS plan is feasible is that there are only two entities (LMSW and Progeny LMS LLC) that together hold over 80% of all of the essential 902-928 MHz Multilateration spectrum (on a MHz-Pops basis) and even one is sufficient for the PE component (and LMSW is already committed). / In terms of there being only one nationwide license, LMSW suggests this for a similar reason as described in this footnote above: if the spectrum is divided among multiple licenses, and if this resulted in multiple licensees, then this could make it more difficult to promptly and efficiently achieve the PE component of the shared

after the auction), and subsequent bids in percent-of-gross-revenue payments made to be made to a fund to advance the PS component of the shared PS/CI/PE Networks,[21] with bidding credits for commitments to special public-safety programs such as outlined in Appendix 1 hereto.[22]

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networks, including where the networks needed all or most all of the spectrum for some applications or for the most effective technology or system architecture.

[21] The bidder would place bids in which it would commit, as a condition of the bid-upon License, to pay to a fund managed by the PS Coordinator a percentage of the gross revenues it obtained by use of the License. The fund would be used solely to advance PS use in the License area of the PS 4.9 GHz allocation. Given that this 4.9 GHz band will be allocated at least primarily to serve public safety, it would make more sense to auction for commercial purposes a portion of this band with bids that directly fund PS use of the band rather than the general Federal Treasury as do auctions of a fully commercial band. Also, such percentage-of-revenues payments would most likely, if the plan as proposed herein succeeds, result over time in a greater aggregate payment (including on a present-dollar-value basis), and certainly more sustained funding, than one-time payments as per recent-year auctions. Further, it would serve to motivate PS to maximize cooperation with CI and PE so that the shared networks were as successful as possible, including in cost efficiencies, since that would increase the PE percentage of profits paid to this fund for PS benefits. (The PS Coodinator, as the fund manager, may in part condition grants based on demonstration of such efficiencies and other goals it sets for PS use of this band.)

[22] Similar to the bidding credit program with respect to service to Tribal Lands, but in this case, the credit would be based on commitments to meet specified goals in a specified time frame with regard to one or more wireless services with clear public-safety or public-resource-protection benefits, such as those described in Appendix 1 hereto. Tribal Lands may also be included as an additional credit.

## The ATLIS Proposal for Exclusive, Coordinated PS, CI, and PE Allocations in the 902-928 MHz, 4.9 GHz, and 217-225 MHz Bands, Providing for Shared Networks and Public-Private Synergies

Introduced above, a summary of this proposal is provided in Attachment 1. This summary further discusses and documents the rationale presented above for side-by-side PS-CI-PE spectrum allocations for shared networks, as well as a practical means to realize these.

Key components of this proposal have been proposed by LSMW (Havens and Telesaaurus) to the FCC in numerous past filing,[23] sometimes under other names, and currently called "ATLIS": "Advanced Technology Land Infrastructure and Security Service." LMWS has also communicated these concepts to PS and CI entities and others with potential stakes (see preceding footnote), including other LMS Multilateration licensees.[24] After these filings, and

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[23] Comments and/or Reply Comments in FCC dockets: (1) RM-10403 regarding a petition by Progeny LMS LLC for rulemaking concerning LMS licenses in the 902-928 MHz band; (2) DA 02-361 regarding the NTIA study on spectrum needs of Critical Infrastructure industries, (3) DA 01-686 regarding the 75-MHz-wide 5.9 GHz band allocated for Intelligent Transportation System ("ITS") uses, (iv) PR Docket No. 92-257 regarding 217-220 MHz AMTS (Automated Marine Telecommunications System) Service (for maritime and land services), and (4) WT Docket No. 02-08 regarding "Reallocation of the . . . Government Transfer Bands" including spectrum in 216-220 MHz, and (5) ET Docket No. 99-231regarding amendment of Part 15 rules. Also, (6) an Ex Parte filing (to be filed promptly following this filing in WT Docket No. 00-32) in ET Docket No. 02-135, regarding Spectrum Policy Task Force Seeks Public Comment On Issues Related To Commission's Spectrum Policies, Public Notice DA 02-1311, Released June 6, 2002. LMSW has also made other written presentations or presentations in phone or in person regarding the concepts of ATLIS to the FCC Spectrum Task Force, WTB, and OET, NTIA, DARPA XG project, as well as various PS and CI trade associations and entities, ITS America, members of Congress, and equipment vendors (Motorola, EADS, Wi-Lan, Microwave Data Systems, others) and system integrators (SAIC, others).

[24] As note above, LMSW (Havens and Telesaurus) hold the majority of the Multilateration A-block LMS-M spectrum in the nation: approximately 80% based on MHz-Pops. LMSW has communicated many of the core concepts expressed in this ATLIS Proposal to Progeny LMS LLC which holds most of the Multilateration B-Block and C-Block LMS-M spectrum, and to FRC, Inc. which holds the remaining issued A-block licenses. LMW-M believes that if this ATLIS Proposal is favorably received by the FCC, NTIA, and

based on input from the above-noted parties, including the FCC, NTIA, and PS and CI entities, LMSW has recently completed this ATLIS concept, and soon after this filing regarding the 4.9 GHz band, LMSW will submit a white paper on ATLIS to the FCC Spectrum Task Force (including for purposes of ET Docket No. 02-135) with copies to the WTB and the above-noted other parties. This will provide further detail on this ATLIS proposal than provided in Attachment 1.

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representatives of PS and CI, that Progeny and FRC may find it in their best interest to participate in ALTIS per the described role for Multilateration licensees (PE as described herein). If they do not, LMSW holds sufficient spectrum to fulfill the PE role described in the ATLIS Proposal for LMS Multilateration, or LMSW may be able to acquire their spectrum for purposes of ATLIS.

Respectfully submitted,

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Attachment 1

Summary, 8-25-02 [rev2]

# ATLIS White Paper
# Regarding Use of 902-928 MHz
# Supplemented by 217-225 MHz and 4.9 GHz
# for Public Safety and Homeland Security, Critical Infrastructure, and Private Enterprise:

# an Advanced-Technology Land Infrastructure and Safety Service
# ("ATLIS")

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This is a summary of the above-captioned proposal LMSW will submit soon to the FCC, (including as Ex Parte filings in dockets regarding the subject spectrum), UTC, NTIA, Federal public safety and homeland security entities, APCO, ITS America and others.

This ATLIS proposal is designed to provide major contributions to meeting the needs of US public safety ("PS") and critical infrastructure entities ("CI")[1] for:

- Additional exclusive spectrum,
- Interoperability, and
- Advanced wireless networks,

and the same for business enterprises and certain Intelligent Transportation System ("ITS") functions served in ATLIS by for-profit private-enterprise licensees ("PE").

The proposal is structured for efficiency and financial viability including via:

(i) No cost of spectrum to PS and CI.

(ii) Network sharing among multiple PS, CI, and PE via secure VPN's, with

(iii) PE providing at it cost, via priority preemption, the large interoperable capacity reserve needed by PS and CI for major emergencies.[2]

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[1] Herein "Public Safety" ("PS") means traditional public safety as described in Section 337(f) of the Act, and "Critical Infrastructure" ("CI") means entities described in Section 309(j)(2) of the Communications Act (the "Act").

[2] Regarding the above stated needs, and the above items (ii) and (iii) as major components of a solution, see (i) Viktor Mayer-Schönberger, "Emergency Communications: The Quest for

(iv) Appropriate multiple bands: (a) each with RF propagation characteristics and spectrum amounts well suited for respective requirements, from rural coverage and basic wide-area voice and data, to urban coverage, "hot-spot" broadband, and point-to-point links, and (b) which provide the new spectrum needed for new technologies that are more spectrum efficient and for traditional and new applications at lower costs.

(v) Simple national coordination for the PS and CI spectrum allocations.

(vi) Other PE and certain CI support of the PS component (described below).

(vii) Scope and solutions worthy of major Federal and State funding of the PS component including for Homeland Security goals for capital and operating costs.

(viii) Ability to use/ leverage advanced, cost-effective components and technology from the GSM/UMTS 900 MHz band (the most used mobile spectrum in the world).

The proposed ATLIS involves, in brief:

New exclusive nationwide spectrum allocations for PS and CI comprising:

(i) Half of 902-928 MHz (one-quarter [6.5 MHz] each to PS and CI), with PS and CI priority access to the other half.[3] The other half licensed to for-profit entities. (See table and discussion in Exhibit 1 below.)

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Interoperability in the United States and Europe," John F. Kennedy School of Government, Harvard University, March 2002; available at http://ksgnotes1.harvard.edu/BCSIA/Library.nsf/pubs/VIktor0203; (ii) PSWN's *Progress Report on Public Safety Spectrum* (November 2001), page 20, Conclusions and Recommendations); (iii) *The 4.9 GHz Band. . . , WT Docket No 00-32, Second R&O & FNPRM, FCC 02-47* (2-27-02), ¶ 46; (iv) *FCC Staff Report on NTIA'S Study of Current and Future Spectrum use by the Energy, Water, and Railroad Industries. . .*(7-30-02), Conclusion section; (v) Bill Moroney (President of UTC), "Critical Infrastructure Needs Exclusive Spectrum," (Radio Resources, June 2002); (vi) *Options for Upgrading Utility Wireless Networks*, (KPMG study for UTC, July 2002). Also, in planning future PS wireless, TIA-ETSI comment: ". . . Project MESA . . . reflects the vision of a mobile broadband-shared network that can be simultaneously accessed by multiple users, with multiple applications in a specified geographical area fully independent from availability of public networks and supply of electrical power."

[3] Re 902-928 MHz, see §90.350 *et. seq*. which describes this "Location and Monitoring Service" ("LMS") band, thus-far allocated primarily for a broad range of "Intelligent Transportation System" ("ITS") applications, private and governmental. Regarding these two halves: see §90.357 (see also Table in Exhibit 1 below): the half we propose for PS and CI is the spectrum now used for "Non-multilateration" systems; the other half is what has been licensed by auction for "Multilateration" systems. LMSW (Havens and Telesaurus) holds geographic licenses for the Multilateration A-Block sub-band (the first listed sub-band in §90.357) in about 80% of the nation. One other entity, Progeny LMS LLC, holds over 90% of the rest of the Multilateration spectrum (the next two listed sub-bands).

(ii) Half of 217-225 MHz (one-quarter [2 MHz] each to PS and CI), with PS and CI priority access to the other half.[4] The other half are licensed to for-profit entities. (Regarding availability, see discussion in Exhibit 1 below.)

(iii) A similar arrangement for the 4.9 GHz band: PS, CI, and PE allocations, for shared networks (details to be provided soon in an Ex Parte filing in WT Docket No. 00-32 based on the ATLIS white paper).

This 200, 900, and 4900 MHz spectrum (and possibly other)[5] would be used (probably with integration of a MSS)[6] for multi-band shared networks: often, not always, (i) sharing in

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The Non-multilateration spectrum is currently licensed only for very short-range systems along highways and railways for ID "tag" readers (passive or active transponders on vehicles) for toll collection and other ID purposes. In the vast majority of the nation, this spectrum is unused by licensed operations. Also, the 75-MHz-wide ITS 5.9 GHz band has been recently allocated by the FCC for advanced dedicated short-range communications (similar allocations in other nations for same ITS purposes), and once 5.9 GHz is licensed and developed, operations on 900 MHz Non-multilateration spectrum should migrate to 5.9 GHz. By use of the entire 26-MHz wide 902-928 MHz band for wide-area mobile systems, as we propose, there will always be channels available even in the localities where Non-multilateration systems are still in operation. Part 15 devices use this band, but will not pose a major problem under the ATLIS plan (see next footnote and Exhibit 2 below).

[4] This white paper will show that these particular 900 and 200 MHz bands, contrary to common perceptions, are not substantially used, including by Part 15 unlicensed devices in 902-928 MHz, Amateurs in 222-225 MHz, and apparent licensed operations in 217-222 MHz. Also see Exhibit 1 below.

Regarding dealing with current users of 902-928 MHz under ATLIS, see Exhibit 2 below.

[5] Possible other spectrum: (i) the VHF Public Coast ("VPC") band: 350 to 500 kHz of paired channels in 157/162 MHz. Formerly licensed (with few exceptions) only along the US coastlines, but per FCC auctions in recent years, now licensed also for land mobile throughout the nation. Havens holds the VPC licenses (1 license per area) in most of the Rocky Mountain state areas, and Maritel holds virtually all of the rest of the VPC licenses for land and coastal areas. There is a 50-kHz (two 25-kHz channels, or four 12.5-kHz channels) public safety set aside in the middle of (and in addition to) this auctioned spectrum. Railroad VHF adjoins this VPC band. If Railroads became stakeholders in/ user of multi-band ATLIS networks (with appropriate secured rights and control for their needs), they may, in time, be able to "trade" their substantial VHF spectrum for use rights in ATLIS networks. (ii) The 75-MHz wide 5.9 GHz band allocated for Intelligent Transportation Systems ("ITS"). Besides use for ITS-specific roadway and roadside Dedicated Short Range Communications ("DSRC"), we propose that it could also be used on a non-interfering basis under the ATLIS plan for coordinated PS, CI, and PE use, including "broadband" applications contemplated for the 4.9 GHz band and network point-to-point links. (The DSRC roadway/ roadside uses will leave most of the spectrum (on a MHz-Pop, and MHz-Land Area basis) unused. ITS functions are primarily for public safety (in

building and operating secure digital network infrastructure for virtual private networks, and (ii) using all or several of these bands for integrated technology and networks and/or multi-band end-user devices.

Such sharing would be among the three classes of licensees in each band, PS, CI, and PE: for-profit licensees serving businesses needing mission critical communications. Large economies of scale would be achieved yielding lower capital and operating costs, quicker and stronger development, etc.

ATLIS PE would be permitted to lease or otherwise use its spectrum and network capacity without limit to serve ATLIS PS and CI (in addition to private enterprise and individuals); ATLIS CI could lease its excess network capacity to ATLIS PS and PE, and (while less likely) ATLIS PS could do likewise to ATLIS CI and PE.

The core 902-928 MHz spectrum (which would probably carry most of the traffic) is in the GMS 900 band, which has about half of all mobile phones in the world:[7] ATLIS would

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the broad sense of combined §337(f) and §309(j)(2)) and the proposed ATLIS use of 5.9 GHz would be a natural extension. A description of the relationship between and need to coordinate advanced ITS and PS wireless is in the Project MESA Statement of Requirements, including in §8.6 "Transparent network and system access" in the ETSI draft V.10 at http://www.projectmesa.org/SoR.htm .

[6] Mobile Satellite Service, such as Globalstar or Iridium, could be useful for coverage remote areas where terrestrial coverage would be too expensive, in some areas before terrestrial coverage is provided, as well as for redundancy and special applications (see the white paper). For this purpose, some ATLIS radios would also have MSS-capability. LMSW has met with these two MSS operators. They are seeking to provide these niche functions as part of their core business, especially for large terrestrial service with major-entity users as the proposed ATLIS. Also, via bankruptcy and financial restructuring, most of the billions of dollars in original equity and debt has been extinguished, and they are now able to price far more attractively, as has been widely reported in the trade press.

[7] See: http://www.gsmworld.com/news/statistics/index.shtml, and http://www.gsmworld.com/news/statistics/substats.shtml :

GSM 900 (GSM using 900 MHz)[7] has 361 million users. GSM 900 components are also in all phones of all GSM 900/1800 subscribers, another 223 million, totaling 584 million out of a total 684 million all GSM subscribers which have GSM 900 RF components. This is 85.4% of all GSM subscribers (April '02). GSM accounts for 71% of all world digital subscribers. Thus, GSM 900 MHz components are in 58% (85.4% x 68%) of all CMRS subscriber phones worldwide.[7] This is roughly two orders-of-magnitude larger than the US market for public-safety and other mission-critical wireless.

Regarding leveraging and adapting GSM 900: One example is GSM-R for railroads (see: http://gsm-r.uic.asso.fr/ ): it uses European allocations in 876 - 915 MHz and 921 - 960 MHz, begun in late 1990's, currently being deployed in linked nationwide systems in Europe

leverage for its use the advanced cost-effective technology and components developed for this GSM band.

In addition to above-noted cost savings by the large economies of scale involved, direct and indirect financial support would be provided to the PS licensees/ users for initial construction and ongoing operation by:

(i) The CI licensees/ users, by providing for the shared networks use of CI antenna sites, fiber, power, right of way, maintenance, etc. on an at-cost basis or other attractive rate. (PS would also provide on the same basis use of the facilities it owns for the shared networks.)

(ii) The PE licensees, and licenses, by providing:

(a) At no cost, the above-noted priority access.

(b) At no cost, use of PE (Multilateration) spectrum in the 902-928 MHz range where the PS spectrum is used by Non-multilateration operations (this provided also by PE to CI.

(c) Proceeds of PE ATLIS-spectrum auctions provided to PS towards its ATLIS capital and operating costs.[8]

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leveraging and adapting standard GSM 900 technology and components for mission-critical railroad communications. The same could be done for land-mobile mission critical communications utilizing newer "3G" on GSM 900, in fact, the GSM-R association (see http://gsm-r.uic.asso.fr/faq.html ) writes: "if we were to start from scratch now we would embrace other possible solutions . . . software radio . . . or UMTS [commercial mobile 3G technology]. Also . . . TETRA has no allocation in the railway spectrum range in the 900MHz band."

Further, DARPA in the US has a "4G" wireless technology development project called "XG." (See: http://www.darpa.mil/ato/programs/xg.htm, .It is being developed for both US military and non-military wireless. Dr. Paul Kolodzy, now head of the FCC Spectrum Task Force, was the initial head of this XG project. I have spoken with Dr. Kolodzy and the current director, Preston Marshall, concerning use of the 902-928 MHz band (and perhaps the other spectrum proposed for ATLIS) as a test bed for, and a major ultimate home for widespread deployment of, the DARPA XG technology.

In any case, initial and future-generation technology for the ATLIS bands would be selected by stakeholder consensus, including public safety. In my view, logically, it would commence with current-generation technology as used in P25, Tetrapol, and narrowband telemetry, and migrate to a mission-critical implementation of 3G or 4G technology developed for commercial wireless, perhaps, as noted, that derives from the DARPA XG project.

[8] LSMS is proposing for the 4.9 GHz and 5.9 GHz that parts be auctioned to PE licensees via bids (after opening cash bids from up front payments) that constitute obligations to pay a certain percent of gross income from the wireless services using the bid-for spectrum, with such

(iii) Monthly fees paid to PS towards its ATLIS costs from monthly fees charged to users of CMRS devices for the safety capabilities of mandated ATLIS RF-chips in all CMRS devices to be used for E911, basic ITS vehicular functions, and other critical safety functions (emergency broadcasts, etc). See description in Exhibit 3 below.

(iv) Major Federal financial support (including for state and especially local PS which most needs additional funding) including for the Homeland Security and interoperability functions.

Together, the above support would greatly offset costs to PS for development and use of its component of ATLIS.

In exchange for their contributions noted above and herein to PS and CI, ATLIS PE licensees would receive:

(i) Rights to use, at no (further) cost, the common network infrastructure: antenna systems, backhaul, switches and nodes, power, etc. provided by PS and CI (see above). LSM-M would secure and pay for the base-station radios and any other equipment specific to operation on its ATLIS spectrum.

(ii) Rights to use, on an at-cost basis, PS and CI infrastructure (antenna and equipment sites, backhaul, etc.) suitable for expansion of the LMS-M networks beyond what PS and CI may be operating in a given area and time. This right would be subject to a reciprocal right of the PS and CI entities with this infrastructure to share in this LMS-M network expansion if they chose to at a later date, on the same at-cost basis.

To be most effective, there would be one nationwide authority for PS (for spectrum assignments, technology selection, system deployments, network sharing arrangements with the other participants, etc.), logically, a Federal Homeland Security function, but which looks to APCO, AASHTO, and other PS organizations, and one authority for CI as UTC, AAR, and other CI entities may decide.[9]

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revenue stream being paid (not to US Treasury) but to the PS ALTLIS coordinator for use by ATLIS PS functions (construction, operations, upgrades, etc.) This will not only help PS funding, but also motive PS and PE to cooperate, along with CI, for efficient shared networks.

[9] Also, regarding PE licensees in these bands, it would be relatively easy for these to cooperate to implement ATLIS functions since: (i) There would be one 4.9 GHz PE license, and one 5.9 GHz PE license, each awarded by auction (see footnote __ above) and conditioned upon all ATLIS requirements. (ii) There are only two LMS Multilateration licensees (LMSW [Havens and Telesaurus] and Progeny LMS LLC) that hold over 85% of all LMS Multilateration spectrum (half of the 902-928 MHz), and even if Progeny does not participate, LMSW participation is sufficient. (iii) There are a handful of licensees that hold the vast majority of all geographic or multi-site licenses issued in the 217-222 MHz range (and few pre-auction licenses are still operational and valid). (What is not licensed yet would be set aside for PS, and the 222-225 would be reallocated from Amateur to PS use.) Accordingly, it would be relatively easy for

Also, this ATLIS spectrum would allow for better technology via "turnaround."[10] Unless there is major new spectrum available, major operators whose spectrum is used up via current technology have to use compromise solutions to ease out of old into compromised new technology. For example, if old technology in congested spectrum uses 25 kHz channel pairs, then a compromise solution for new technology may be limited to "refarming" those into more narrow channels or TDMA in 25 kHz, whereas, with sufficient new spectrum such as under ATLIS, new technologies using broader channels, and techniques such as Time Division Duplex, OFDMA, etc. could be pursued. As these are developed, the traffic on the old spectrum would be shifted to the new spectrum, and the old spectrum would then be integrated into the multi-band service: this could be planned for optimum utility.

In addition to basic and advanced communications for PS, CI, and PE customers, other high-public-benefit functions, and PS-funding mechanisms, proposed for ATLIS are summarized in Exhibit 3 below.

This ATLIS proposal is closely aligned with the key published goals of the FCC Spectrum Task Force and statements by Chairman Powell on spectrum policy priorities, as well as the demands of current communication applications and technology: i.e., due to their increasing complexity, magnitude, and cost, they increasingly call for (i) larger higher-capacity networks hence either major public-access networks, or as per the ATLIS proposal, major non-public networks shared by multiple entities in secure VPN mode, and (ii) multiple bands that are in frequency and amount suitable for the various types of coverage and applications involved.

The proposal is clearly responsive to current priorities for "Interoperability," "Homeland Security," spectrum efficiencies, spectrum availability for PS and CI, and advanced applications and technologies (which need new spectrum to deploy).

Equipment vendors and system integrators including SAIC, Motorola, EADS-EDSN, Microwave Data Systems, and Wi-Lan have been briefed and have interest in participation in

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the small number of PE licensees involved to coordinate participation in various ATLIS networks with the PS and CI ATLIS authorities.

[10] An example of why "turnaround" spectrum is needed is in the 800 MHz US cellular bands. These became well used in major markets with analog first generation (1G) technology, and when the need arose for 2G digital, TDMA IS-95 was (for some time) the compromised choice due to it fitting in the existing channel width. With the spectrum well used, it was more difficult to implement wider-channel technology such as CDMA and GSM and thus, these took longer time to deploy. Had there been sufficient new "turnaround" spectrum, then the US cellular industry may have reached a consensus, as Europe did, on wider-band technology. These are now the world standard, and to this day, Europe and Asia are well ahead of the US in commercial wireless largely for this reason, with billions of dollars in economic loss to the US. Similarly, Europe is again ahead in spectrum allocations for PS and CI: allocations for 2G digital professional mobile radio (for TETRA, Tetrapol, GMS-R, etc.; see. e.g., the paper by Viktor Mayer-Schönberger, in footnote __ above). The ATLIS plan would put the US ahead in essential mission-critical wireless service: it needs to be more, not less (as it has been) sophisticated and well-planned than commercial wireless.

ATLIS planning stages, subject to a showing of interest by the targeted stakeholders, FCC, and NTIA.

In sum, realization of the ATLIS proposal (even the core 902-928 MHz component) would substantially fulfill the critical needs for new wireless spectrum, applications, technology, and systems for Public Safety and Critical Infrastructure as well as provide viable Private Enterprise wireless for private businesses and a host of ITS functions.

Respectfully,

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Three Exhibits follow

Exhibit 1

ATLIS Spectrum

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900 MHz Core Spectrum for the proposed ATLIS service

| Block* | Wide band | Narrow band | Total | *Under ATLIS Proposal* |
|---|---|---|---|---|
| N-1 | 902.00 - 904.00 | | 2.00 MHz | PS & CI Exclusive** |
| M-A | 904.00 - 909.75 | 927.75 - 928.00 | 6.00 MHz | PE, but PS&CI access & priority |
| N-2 | 909.75 - 919.75 | | 10.00 MHz | PS & CI Exclusive |
| *N-3 & M-B (current)* | *919.75 - 921.75* | *927.25 - 927.50* | | |
| N-3 *(per ATLIS)* | 919.75 - 920.75 | | 1.00 MHz | PS & CI Exclusive |
| M-B *(per ATLIS)* | 920.75 - 921.75 | 927.25 - 927.50 | 1.25 MHz | PE, but PS&CI access & priority |
| M-C | 921.75 - 927.25 | 927.50 - 927.75 | 5.75 MHz | PE, but PS&CI access & priority |
| Total | | | 26.00 MHz | |

Regarding the 4.9 GHz band, LMSW proposes a similar 50-50 spectrum allocation (as per above chart) between, on the one hand, PS and CI, and on the other, PE.

There would be a similar split in the 217-225 MHz band.

Despite appearances, this 217-225 MHz spectrum is largely available for the proposed ATLIS use:

(i) 217-218 and 219-220 MHz is licensed to AMTS: per FCC filings by the subject licensees, most AMTS licenses issued to date were not placed in operation by the construction deadline, nor did they meet the coverage requirement. They are thus terminated under §1.946 and §1.955. The FCC has planned but not yet scheduled an

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* From Table: Block key: "N" means "Non-multilateration" spectrum blocks, numbered here by LMSW as "1," "2," and "3." "M" means "Multilateration," and "A," "B," and "C" are the block designations of the FCC. Note: N-3 and M-A are the same: this spectrum is currently a shared allocation between Non-Multilateration and Multilateration operations. §90.357 sets forth these Multilateration and Non-multilateration spectrum blocks.

** Prior to moving to the 5.9 GHz band, Non-multilateration systems (very short-range systems principally on roadway [e.g., "EZ Pass"] and other transportation systems) would be protected. The ATLIS networks would use the Multilateration spectrum to provide coverage within and near Non-multilateration systems.

auction of AMTS spectrum. Rather than hold such auction, this spectrum should be licensed under the ATLIS proposal, for joint PS-CI use.

(ii) Spectrum in 218-219 MHz has been only partially licensed, and this, only nominally developed.

(iii) 220-222 MHz has been licensed in 5-kHz channel pairs (aggregation allowed) per auctions, but only a nominal amount (under auctioned and pre-auction licensing) is in actual operation: the 5 kHz equipment vendors, SEA and Securicor, both failed (see, e.g., granted request for extension of construction deadline of Warren C. Havens on ULS for Call Sign WHV211). It is highly doubtful that licensees would maintain, at large financial loss, operations of systems with few if any customers using equipment that is no longer being sold and supported and never had substantial success in the marketplace. In any case, these licensees are looking for a viable use of their spectrum, and the ATLIS plan presents such.

Also, there is 150 kHz in this band set aside for Public Safety.

(iv) 222-225 is currently an Amateur band. It could be allocated exclusively for PS and CI use under the ATLIS proposal.

Exhibit 2

Other Users in 902-928 MHz under ATLIS

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1. Low-power unlicensed Part 15 devices: see §90.361: Part 15 devices used in wireless systems (such as for wireless meter reading) for critical infrastructure would be switched to Part 90 status, and would operate under the CI spectrum allocation in the ATLIS 902-928 MHz band (tuned off of the PS allocation), and other Part 15 devices, such as indoor consumer cordless phones, and LANS (most of which are now on the 2.4 and 5 GHz bands using 802.11 variations) would be phased out: no further sales after a cut-off date.

   It is a waste of ideal mobile spectrum to use it for Part 15 devices, especially when they have orders of magnitude more spectrum and capability via 2.4 GHz, 5 GHz UNII, unlicensed PCS, and Ultra Wide Band which promises to exceed the traditional unlicensed equipment in capability and cost. In any case, the importance of the ATLIS uses warrant these modifications of Part 15 use.

2. Federal and ISM use: see §90.353(a): Federal entities, via NTIA, have priority rights in 902-928 MHz for radiolocation but have used the band only lightly (Navy ship radar, some wind-profile radiolocation, and occasional other use). Under my proposal, Federal public safety use along with other public safety would be wide-scale, and for such ends, NTIA would coordinate and contain any other Federal use as needed so they would not interfere (appropriate NTIA-FCC rule changes would implement this).

   ISM devices use 902-928 MHz, but they do not receive and do not intentionally or substantially transmit, thus pose little problem.

3. Amateurs' use: see §90.361: Amateurs also may use this band on a secondary non-interfering basis to LMS (and Federal) operations but only slightly use it. A reasonable amount of use may be helpful in civil defense, especially if coordinated with the Amateur community (e.g., if they had mobile radios capable of basic interoperation with the ATLIS radios upon trigger by public safety). If Amateur use becomes a problem, the licensed ATLIS users would have good cause for grant of remedial restrictions or phase out by the FCC.

Exhibit 3

Additional ATLIS Functions and PS Funding Mechanisms

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Note: in items 1, 2, and 3 below, the ATLIS-enabled CMRS devices or the ATLIS radios would have integrated location capability (network and/or GPS) (a core capability in all 3G wireless and beyond):

ATLIS-enabled CMRS for E911, basic ITS functions, etc.

1. ATLIS networks, once sufficiently built out (equal or better coverage than CMRS), could replace and improve on CMRS for E911. CMRS devices and would all have FCC-mandated ATLIS RF chips for E911 calls, and by such they could be connected not only to PSAP's but via PSAP's to responders in the field (PS, and if needed, CI) heading to or at the incident location. Also, unlike CMRS-based E911, such ATLIS E911 would allow for group calls to the victims: often, responders will include a number of entities, such as police and medical, police and fire and medical, etc. This arrangement would save CMRS money (E911 is costing CMRS billions of dollars to launch, and eventually more to maintain) and lessen fears and insurance costs regarding liability: This savings would offset cost of the mandated ATLIS RF chip and (see text above). (CMRS could, of course, pass on the net costs, if any, to their subscribers.)

2. The same ATLIS RF chips would be DOT-mandated for installed or docked radios in all roadway vehicles (in most cases included in Telematics devices providing for communications, location, information, computing, and entertainment) to allow for "electronic license plates" and other basic safety functions, e.g.:

   a. Authorization, by "smart" highway corridors, to qualified vehicles to use HOV and LEV highway lanes/ time slots (others get tickets automatically), or variable charges of highway lanes and time slots depending on the level of its noxious emissions, level of passengers per vehicle class, and congestion level.[11]

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[11] A partial implementation of this concept is Singapore's Electronic Road Payment ("ERP") system currently in operation. From the Singapore Land Transport Authority website: http://www.gov.sg/lta/MenuFrame2.htm.

> Electronic Road Pricing (ERP) is simply an electronic system of road pricing. It is designed to automate our current road pricing system - no more paper coupons or enforcement officers at the gantries. The main difference is the pay-when-you-use principle. This is a fair system as the motorist is charged only if he passes the ERP gantry.
>
> Its Aim. With ERP, motorists will be more aware of the true cost of driving. Charges will be levied on a per-pass basis and can vary according to time and

b. "Push" and "pull" notification of dangerous or congested road conditions ahead (and disabling entertainment and [other] communications where warranted).

c. PS one-way broadcasts of voice and data messages in certain emergencies.

d. Other functions under the general capability provided whereby vehicles on the road can interact with PS and the (increasingly "intelligent") highway systems, saving tens of thousands of life per year and (per ITS America) and billions of dollars in lost workforce productivity, mitigating environmental impact, etc.

In short, ITS wireless should not be left to a patchwork of CMRS and small private systems.[12] ATLIS can make ITS wireless effective as a principal goal: PE ATLIS can carry most of the ITS traffic. This was clearly contemplated by the FCC when allocating the

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congestion levels. With this system of charging, a motorist will be encouraged to choose whether to drive, when to drive and where to drive. He may choose a different route, destination, time of travel, or not to travel at all. He may decide to car-pool or use public transport. Those who choose to pay and stay on the road will enjoy a smoother ride.

Its Advantages. *Fair*: Charges are based on usage so those who contribute more to the congestion, pay more and those who use the roads less frequently or who travel during non-ERP hours will enjoy more road tax rebates. *Convenient*: No need to buy daily/monthly paper licences. *Reliable*: Does not need human enforcement personnel, thereby removing the potential for human error.

This Singapore ERP uses RF readers such as used in "EZ Pass" technology on Non-multilateration LMS spectrum. Our idea in the text above would expand on this ERP system including via (i) use of wide-area wireless networks tracking the vehicles (integrated with fixed-point EZ pass type ID readers) so that a larger extent of highways throughout a region are involved, and (ii) more sophisticated electronic tags or license plates and more levels of pricing including for High Occupancy Vehicles ("HOV's"), Low Emission Vehicles ("LEV's"), noxious emissions, etc.

[12] See: Paul Najarian, "Is a Wireless Architecture the Future of ITS?" in *ITS View* (journal of ITS America), July 2001 Issue, available at below Web link.

http://www.itsa.org/ITSView.nsf/ff53871fee52042a85256a6e00096b5b/73f38dcdc16296b185256a6f000b816c?OpenDocument . Mr. Najarian, at the time of writing the article, was the ITS America director of Telecommunications and also directed its ITS Public Safety and Telematics. This article discussed the need for a dedicated communications architecture and infrastructure, including its wireless infrastructure components, for Intelligent Transportation System applications, discussed how this need is not being met by existing plans and available networks and technologies, and proposes steps toward meeting this need. ATLIS would in large part provide for these needs, in conjunction with the new 5.9 GHz DSRC services.

Location and Monitoring Service in the 902-928 MHz band.[13] See also the TIA-ETSI Project MESA's description of the need to coordinate advanced ITS and PS wireless is in the Project MESA Statement of Requirements, including in §8.6 "Transparent network and system access" in the ETSI draft V.10, at http://www.projectmesa.org/SoR.htm .

Regarding items 1 and 2 above, the owners of the ATLIS-enabled devices would be charged a monthly fee (collected by the CMRS provider) for the Federally mandated capabilities and use of all Federally mandated functions. (If, e.g., $1/month/device, and assuming 120 million devices, and 10¢/device collection and handling fee to CMRS, then the net proceeds would be $1.3 billion/year.) If PS ATLIS network capability is solely used for these functions, then all the net proceeds would go to PS; if PE capability is involved, then it would obtain a prorata amount of the proceeds. In addition, CMRS users electing to use the ATLIS capability for certain ITS-functions or other functions provided by PE ATLIS would pay use fees to PE (per collection arrangement with CMRS or direct billing by ATLIS PE).

Greater Back-up Capacity. Via the arrangements described above (whereby all CMRS phones would be capable of operating on the ATLIS network, at least for certain basic voice and data functions), in a large-scale emergency, if there were not sufficient ATLIS radios in the affected area,[14] [15] then PS, and the various other persons involved in emergency responses (professional and volunteer) working under PS, could use the ATLIS-enabled CMRS phones (again, while these would not have all of the functions of an ATLIS radio, they would be serviceable in such cases), and by such, keep communications interoperable on the ATLIS network.

3. Asset tracking for Homeland Security. Tracking assets, including large shipping containers and their contents, besides having major commercial value, presents one of the major unsolved problem areas for Homeland Security due to the potential for using them as means to deliver contraband and for terrorism. This was discussed at the annual meeting of the Intelligent Transportation Society at the session on 4-30-02 "Tracking and Tracing Assets, Cargo, and Operators." Currently, there are inadequate means at US borders and internally to check container contents, assure that locks and seals are not broken after inspection on route, etc. Once ATLIS is sufficiently built out, it can provide the needed functions,

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[13] See FCC releases in PR Docket No. 93-61. Available in the LSM auction "Bidder Package" at: http://wireless.fcc.gov/auctions/21/releases.html#bip .

[14] In such case, ATLIS radios could be borrowed from other areas, but this could take time, and would have limits that may be exceeded in some cases.

[15] Per the priority-access arrangement described in the text above (whereby PS and CI would have priority access to all PE ATLIS network capacity in defined emergencies), the more PE network capacity is built out, the more back-up *network* capacity is available for PS. But to use this PE network capacity, PS needs reserve radios. Since they will probably only keep modest reserve radios for day-to-day and "routine" emergencies, the issue is: where to get a larger pool of reserve radios in especially large-scale emergencies. The above is a solution.

probably in conjunction with an integrated Mobile Satellite Service (see footnote __ in text above).

4. Wireless links for remote environmental monitoring: of water, air, ozone, etc., for point source pollution and overall ecosystem health; for certain wildlife monitoring; and for detection of intentional or accidental pollution via chemical, biological, or nuclear releases. For this, foundation and corporate vendor co-funding grants would be sought, in conjunction with uses by research institutions and other educational functions.

5. Nextel swap of 800 and 900 MHz for public safety 700 MHz (when the TV's are cleared off), thus consolidating public safety at 800 to 900 MHz (including 902-928 MHz). This could save billions of dollars in potential relocation costs to PS and CI under currently discussed plans for mitigation of interference in 800 MHz. Also, 900 MHz is used in Europe now for mission-critical communications: the GSM-R band (in 876 - 915 MHz and 921 - 960 MHz) (GSM 900 itself is 880-915 MHz and 925-960 MHz), and as 3G CMRS develops worldwide on new UMTS spectrum, it is possible that in time some current GSM 900 spectrum will be available for PS and CI, thereby increasing the market for products developed on the ATLIS 900 MHz component spectrum. In this regard, a goal of the TIA-ETSI Project MESA for advanced PS wireless is uniform spectrum in the US and Europe.