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Submitted By:  
CTA  
E-SAT  
FINAL ANALYSIS  
GE STARSYS  
VITA

United States of America

Proposals for the Work of the Conference - Agenda Item 1.9.1

New Allocations for the  
Mobile-Satellite Services Operating Below 1 GHz

### **Introduction to Flexible Allocation Concept**

Little LEO systems are inherently global systems. Ideally, these systems would use the same frequency allocations in every country in which they operate. But because of differences in allocations and spectrum usage in various countries, it is extremely difficult, if not impossible, to identify sufficient spectrum for consistent worldwide allocations for NVNG MSS. There is no single band below 1 GHz that is: 1) used on a worldwide basis by services that can share consistently with NVNG MSS on a co-primary basis, and 2) is wide enough to support the expected demand for NVNG MSS services.

For these reasons, it is necessary to identify a number of frequency bands for allocation to NVNG MSS. With a number of bands available for use by these systems, individual countries and regions will have the flexibility to determine which frequencies within those bands that can be licensed to NVNG MSS systems. Those frequencies which fit within the spectrum requirements of an administration can be chosen from the wider allocation, while those frequencies which would not be appropriate for use in that administration can be used by other services.

A variety of technical approaches makes such a flexible allocation approach feasible. Frequency agile transmitter technology would allow Little LEO satellites to use only those frequencies appropriate for the areas in which they are operating. Although this approach will require the satellite to be more complicated than one using a single consistent global allocation, this additional complexity is more than justified by the access to spectrum it affords NVNG MSS systems. The flexible allocation approach is the only one which will allow sufficient amount of spectrum to be made available for use by NVNG MSS in the bands most appropriate for the administrations in whose jurisdictions the systems will operate. The allocation proposals herein are based on this flexible concept<sup>1</sup>. This concept is also addressed in the CITELE Report.<sup>2</sup>

Wider allocations in U.S. proposals for the conference provide more flexibility that can be exercised by domestic regulators when making individual assignments. These flexible allocations permit multiple worldwide systems to operate. These flexible allocations recognize the sovereign right of ITU Members to make specific sub-allocations and assignments, and also permit satellite system coordination to proceed. On the other hand, small, fragmented limited allocations in U.S. proposals for the conference would make it difficult to obtain international consensus and difficult to coordinate as may be mandated by ITU regulatory procedures.

Adopting such worldwide/regional use allocations in one or more bands does not mean that any one of those bands can be used in a country without its approval, consent and coordination. However, such an allocation in the ITU Radio Regulations means that it can be used selectively in countries where its use is desired and would not cause interference to other services

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<sup>1</sup> See Annex 1 “Additional (Domestic) Justification to Support Allocation Proposals” (Previously IWG-2A/94).

in that band in that country. Moreover, the use of the band in a country by another service to which interference might be caused could change through the years, as an administration changes its pattern of domestic usage.

Domestic decisions are made after the WRC by each country to modify their domestic allocations table, choosing those ITU Allocations that they wish to implement. After this process, a country can then make a frequency assignment which is an authorization for a station to use a specific frequency within the allocation to the radio service in the respective domestic table.

Different Approaches to Uplink and Downlink MSS Allocations:

*Downlink Allocation:* The situation for downlink allocations is different than that for uplinks. MSS uplink transmissions are a "local" event, which can be easily controlled by the country in which the uplinks are operating. For the downlinks, however, the transmissions cover large regions of the earth. The footprint of the downlink antenna covers thousands of square kilometers. Therefore, the satellites cannot change downlink frequencies on a country-by-country basis.

In this case, sharing would be feasible based on the power flux density (pfd) limit delivered to the earth's surface by the satellite. The inherently global nature of MSS satellite systems makes downlink allocations which are consistent on a worldwide basis the preferred choice. Alternatively, in a few cases, regional allocations may be workable as well.

The use of any frequency for downlinks by the mobile-satellite service would be subject to coordination with other co-primary services under S9.11bis (Res 46). In the event of an exclusive

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<sup>2</sup> CITEL PCC.III, WRC-97 Report, Chapter 4.1, Annex 2, Jan. 13, 1997, Final Version, Section 9.0.

allocation to the mobile-satellite service, coordination would be required between the different mobile-satellite systems and therefore the provisions of S9.11bis would still be needed.

*Uplink Allocation:* In a worldwide MSS uplink allocation, an administration desiring to make assignments to mobile terminals operating in a Little LEO system would also follow ITU coordination procedures. Of particular importance is that each administration has full control of frequencies originating from its own territory. Thus, if an administration does not want a Little LEO uplink, that administration can always prohibit it even in a worldwide allocation.

It has been demonstrated that Little LEO systems can co-exist with existing users of the spectrum. The Little LEO systems employ advanced technology to share spectrum without causing interference or disruption of existing systems. Since transmissions are very short and infrequent, traffic is easily managed. Using either low power wideband or frequency hopping narrowband techniques, sharing with existing services is possible. Combining these sharing techniques with the characteristics of the Little LEO systems usage, these systems can successfully co-exist with other radio services.

Since these systems are optimized for use by widely dispersed users and for applications that feature rural and remote operations, this new technology is intended to introduce new applications and to complement rather than displace existing services.

## Flexible Allocation Proposal

The U.S. proposals for additional MSS allocations below 1 GHz are intended to provide a flexible allocation approach to accommodate the needs of all radio services on a worldwide basis. The allocations in these proposals will give administrations the flexibility to change their domestic allocation tables and decide on individual assignments/licenses in smaller portions of larger bandwidth international allocations.

If adopted, these allocations within the ITU Table of Allocations will give domestic regulators the flexibility to: 1) permit the non-geostationary data only mobile satellite systems to grow as their needs grow; 2) provide the opportunity for competitive multiple system providers; 3) ensure that existing radio services are not harmed, 4) permit coordination of several systems within the ITU regulatory procedures; and 5) recognize regional differences in spectrum use.<sup>3</sup>

This proposal also recognizes studies on sharing between non-geostationary data-only mobile satellite services and other radio services which indicate that, as the shared bandwidth becomes wider, the probability of interference to existing services is reduced to a diminishingly small value.<sup>4</sup> Accordingly, the provision of multiple allocations over wider spectrum would improve the performance of the system and remove any concerns regarding receiving or causing interference to existing users in that band.

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<sup>3</sup> Examples of this flexible approach are the bands 455-456MHz and 459-460MHz allocated to the mobile satellite service by WRC-95 in ITU Region 2. These Earth-to-space allocations may be implemented in one country in the region, but not another. For example, the ITU Table allocates 450-470MHz to fixed and mobile in Regions 1, 2, and 3, and also mobile-satellite in Region 2. The U.S. uses a portion of this band for public safety private land mobile systems. In Europe, it is used for a common carrier land mobile service, whereas Brazil uses it for fixed services.

<sup>4</sup> See, for example, ITU-R 8D/Temp/133 (5 November 1996).

This proposal addresses allocations for non-geostationary data-only mobile-satellite systems operating in frequency bands below 1 GHz. Since initial allocations were made at WARC-92, the U.S. has licensed three systems to operate in those limited allocations, and has six pending applications for licenses.

Sharing Studies:

Under Resolution 214, WRC-95 gave the NGSO MSS industry the agenda to conduct sharing studies. These studies showing sharing feasibility in a number of bands were presented to the 8D study group in Geneva in October 1996. To summarize, there are multiple interference avoidance methods that can be employed by the MSS service provider: dynamic channel avoidance techniques; modulation techniques; adjustable power of transmission (pfd); adjustable transmission duration time; frequency agile flight radios; and on-board computing capability.

Concurrent with these studies is the procedural approach to international allocations and national assignments contained in this paper. Proposals for additional allocations and modification to existing allocations can be made under WRC-97 agenda item 1.9.1 and Resolutions 214 and 714 from that conference.

The experience of use of the existing MSS bands below 1 GHz, as well as recent ITU-R studies, are reflected in the draft Report of the Conference Preparatory Meeting (CPM). These studies indicate that operational and technical means are available to facilitate sharing between the non-geostationary data-only mobile satellite services and other radio communication services having allocations in the same bands below 1 GHz.

The draft CPM report states that additional spectrum will be necessary to meet the rapidly developing, near-term and longer term requirement for non-geostationary data-only mobile

satellite service systems operating below 1 GHz. Recent demand studies have indicated that additional spectrum for NVNG mobile satellite service systems is necessary.

Since all non-geostationary data only mobile satellite service spectrum will be shared with other radio services, the allocations to the several different services in the shared bands must be much larger than the spectrum required by any one of them. For example, the spectrum allocated internationally on a shared basis for the mobile service from 100-960 MHz is approximately 715 MHz, which must accommodate government and non-government use, maritime, aeronautical, and public and private land mobile uses.

### **Frequency Bands Proposed**

The bands proposed for additional allocation to non-geostationary data-only mobile satellite service systems are 138-144, 146-148, 149.9-150.05, 150.05-156.7625, 174-230, 380-387, 387-390, 390-399.9, 399.9-400.05, 400.15-401, 430-440, 440-450, 470-608, and 614-806 MHz. For proposals concerning 401-406 MHz see IWG-2A/41, 450-470 MHz see IWG-2A/84 plus Addendum 1, and for MSS feeder links at 1390-1400 MHz and 1427-1432 MHz see IWG-2A/77.

The following proposals are based on WRC-95 Final Acts. ITU Geneva. 1996

Article S5

Frequency Allocations

Section IV. Table of Frequency Allocations

MHZ

138-148

Allocation to Service
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MOD

Region 1	Region 2	Region 3
138-143.6 AERONAUTICAL MOBILE (OR) <u>MOBILE-SATELLITE</u> (space-to-Earth)  S5.210 S5.211 S5.212 S5.214 MOD <u>S5.209</u>	138-143.6 FIXED MOBILE RADIOLOCATION <u>MOBILE-SATELLITE</u> (space-to-Earth) Space Research (space-to-Earth)  MOD <u>S5.209</u>	138-143.6 FIXED MOBILE <u>MOBILE-SATELLITE</u> (space-to-Earth) Space Research (space-to-Earth)  S5.207 S5.213 MOD <u>S5.209</u>
143.6-143.65 AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth)  S5.211 S5.212 S5.214 MOD <u>S5.209</u>	143.6-143.65 FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth)  MOD <u>S5.209</u>	143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth) <u>MOBILE SATELLITE</u> (space-to-Earth)  S5.207 S5.213 MOD <u>S5.209</u>

143.65 - 144 AERONAUTICAL MOBILE (OR) <u>MOBILE SATELLITE</u> (space-to-Earth)  S5.210 S5.211 S5.212 S5.214 MOD <u>S5.209</u>	143.65 - 144 FIXED MOBILE RADIOLOCATION Space Research (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth)  MOD <u>S5.209</u>	143.65 - 144 FIXED MOBILE Space Research (space-to-Earth) <u>MOBILE-SATELLITE</u> (space-to-Earth)  S5.207 S5.213 MOD <u>S5.209</u>
146 - 148 FIXED MOBILE except aeronautical mobile (R) <u>MOBILE-SATELLITE</u>  (Earth-to-space)	146 - 148 AMATEUR  S5.217 ADD <u>S5.216A</u>	146 - 148 AMATEUR FIXED MOBILE  S5.217 ADD <u>S5.216A</u>

Reason: New allocations are necessary in needs of the non-geostationary, non-voice mobile satellite service through the year 2002. ITU-R studies indicate sharing is possible. Mobile-satellite service, non-geostationary systems, use of allocations within the amateur bands would only be for emergency communications as called for in Resolution 640.

ADD S5.216A Additional allocation: the bands 146-148 and 430-440 MHz are also allocated in the mobile-satellite service, limited to non-geostationary satellite systems, for use only during emergency communication situations as an augment to national emergency communication services in accordance with Resolution No.640.

Reason: The allocation for the mobile-satellite service within the bands allocated to the amateur service is intended to be an argument to national emergency services providing critical communications as requested by Resolution No. 640.

149.9 - 150.05	<del>LAND</del> MOBILE SATELLITE (Earth-to-space) MOD <u>S5.209</u> SUP <del>S5.224</del> RADIONAVIGATION-SATELLITE  MOD S5.220 S5.222 S5.223
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Reason: ITU-R studies now confirm that sharing between RNSS and MSS is possible, and therefore, restriction of allocation to LMSS is no-longer necessary.

MOD S5.209 The use of the bands ~~137-138~~ 156.7625 MHz, ~~148-149.9~~ MHz, 174-230MHz, 400.15-401 MHz, and 440-450 MHz. ~~455-456~~ MHz and ~~459-460~~ MHz by the mobile satellite service ~~and the bands 149.9-150.05 MHz and 399.9-400.05 MHz~~ by the ~~land mobile satellite service~~ is limited to non-geostationary satellite systems and is subject to coordination under the provisions of Res. 46.

Reason: To restrict existing and new allocations for the mobile-satellite service to non-geostationary systems.

MOD S5.220 The use of the bands 149.9-150.05 MHz and 399.9-400.05 MHz by the ~~land-~~ mobile satellite service is subject to coordination under Resolution 46 (Rev. WRC-95)/No.S9.1 l A. The ~~land-~~ mobile satellite service shall not constrain the development and use of the radionavigation-satellite service in the bands 149.9-150.05 MHz and 399.9-400.05 MHz.

Reason: Consequential modification is necessary in view of proposal to convert the land mobile satellite to the mobile-satellite service.

SUP S5.224

Reason: The restriction to a secondary allocation is no longer necessary after 1 January 1997, and recognizes proposal to change 149.9-150.05 MHz and 399.9-400.05 MHz allocations from LMSS to MSS.

150.05 - 153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY <u>MOBILE-SATELLITE</u> (Earth-to-space) S5.149 MOD <u>S5.209</u>	150.05 - 156.7625 FIXED MOBILE <u>MOBILE-SATELLITE</u> (Earth-to-space)
153-154 FIXED MOBILE except aeronautical mobile (R) <u>MOBILE-SATELLITE</u> (Earth-to-space) Meteorological Aids MOD <u>S5.209</u>	
154-156.7625 FIXED MOBILE except aeronautical mobile (R) <u>MOBILE-SATELLITE</u> (Earth-to-space) S5.226 S5.227 MOD <u>S5.209</u>	

Reason: To provide additional allocations for the mobile satellite service in order to satisfy the needs through the year 2002.

174-223 BROADCASTING <u>MOBILE-SATELLITE</u> Earth-to-space  S5.235 S5.237 S5.243 S5.244 MOD <u>S5.209</u>	174-216 BROADCASTING <u>MOBILE SATELLITE</u> (Earth-to-space) Fixed MOBILE  S5.234 MOD <u>S5.209</u>	174-223 FIXED MOBILE BROADCASTING <u>MOBILE-SATELLITE</u> (Earth-to-space)  S5.223 S5.238 S5.240 S5.245 MOD <u>S5.209</u>
223-230	216-220	223-230

BROADCASTING <u>MOBILE-SATELLITE</u> (Earth-to-space)  Fixed Mobile  S5.243 S5.244 S5.246 S5.247 MOD <u>S5.209</u>	FIXED MARITIME MOBILE <u>MOBILE-SATELLITE</u> (Earth-to-space)  Radiolocation S5.241  S5.242 MOD <u>S5.209</u>	FIXED MOBILE BROADCASTING AERONAUTICAL RADIONAVIGATION <u>MOBILE-SATELLITE</u> (Earth-to-space) Radiolocation  S5.250 MOD <u>S5.209</u>
	220-225 AMATEUR FIXED MOBILE <u>MOBILE-SATELLITE</u> (Earth-to-space) Radiolocation S5.241 MOD <u>S5.209</u>	
	<del>225-235</del> <u>230</u> FIXED MOBILE <u>MOBILE-SATELLITE</u> (Earth-to-space) MOD <u>S5.209</u>	
230-235 FIXED MOBILE  S5.244 S5.247 S5.251 S5.252	<del>230-235</del> FIXED MOBILE	230-235 FIXED MOBILE  Aeronautical Radionavigation  S5.250

MOD

312 - 315	FIXED MOBILE <del>mobile satellite (Earth to Space)</del> <u>MOBILE-SATELLITE (Earth-to-space)</u> S5.254 S5.255
335.4 - 387	FIXED MOBILE S5.254 ADD <u>S5.254A</u>

387 - 390	FIXED MOBILE <del>mobile-satellite (space-to-Earth)</del> <u>MOBILE-SATELLITE (space-to-Earth)</u> S5.208A S5.254 S5.255
390 - 399.9	FIXED MOBILE S5.254 ADD <u>S5.254A</u>
399.9 - 400.05	<del>LAND-MOBILE-SATELLITE</del> (Earth-to-space) MOD S5.209 RADIONAVIGATION-SATELLITE MOD S5.220 S5.222 SUP <del>S5.224</del> S5.260

ADD S5.254A     The use of the band 380-387 and 390-399.9 MHz by the mobile-satellite service is limited to non-geostationary-satellite systems and is subject to coordination under the provisions of Resolution 46 only.

Reason:            To provide additional allocations for the non-geostationary mobile satellite service in order to satisfy the needs through the year 2002.

NOC

400.05 - 400.15	STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) S5.261 S5.262
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Reason:            Need to maintain allocation for the standard frequency and time satellite service.

400.15 - 401	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) MOD S5.208A MOD <del>S5.209</del> SPACE RESEARCH (space-to-Earth) S5.263 Space Operation (space-to-Earth) S5.262 MOD S5.264
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Reason:            Consequential changes to footnotes to table are necessary as a result of proposed changes in allocations.

MOD S5.264     The use of the band 400.15-401 MHz by the mobile-satellite service is subject to coordination under Resolution 46 (Rev. WRC-95)/No.S9.11 A. The power flux-density limit indicated in Annex 2 of Resolution 46 (Rev. WRC-9S)/Annex 1 of Appendix S5 shall apply. ~~until such time as a competent radiocommunication conference revises it.~~

Reason: ITU-R studies indicate that the pfd values indicated in Annex 2 of Resolution 46 are valid.

For allocation proposals concerning 401-406 MHz, see IWG-2A/41.

MOD

430 - 440 AMATEUR RADIOLOCATION S5.138 S5.271 S5.272 S5.273 S5.274 S5.275 S5.276 S5.277 S5.280 S5.281 S5.282 S5.283 ADD <u>S5.216A</u>	430 - 440 RADIOLOCATION Amateur <u>MOBILE-SATELLITE</u> <u>(space-to-Earth)</u> S5.271 S5.276 S5.277 S5.278 S5.279 S5.281 S5.282
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Reason: The allocation for the mobile-satellite service within the bands allocated to the amateur service is intended to be a complement to that latter service in situations involving emergency communications as provided for the Resolution No. 640.

440 - 450	FIXED MOBILE except aeronautical mobile <u>MOBILE-SATELLITE</u> <u>(space-to-Earth)</u> Radiolocation S5.269 S5.270 S5.271 S5.284 S5.285 S5.286 MOD <u>S5.209</u>
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Reason: To provide additional allocations for the non-geostationary mobile satellite service in order to satisfy the needs through the year 2002.

For allocation proposals concerning 450-470 MHz, see IWG-2A/84 plus Addendum 1.

470 - 790 BROADCASTING  S5.149 S5.294 S5.296 S5.300 S5.302 S5.304 S5.306 S5.311 S5.312 ADD <u>S5.292A</u>	470 - 512 BROADCASTING Fixed Mobile S5.292 ADD <u>S5.292A</u> S5.293	470 - 585 FIXED MOBILE BROADCASTING S5.291 ADD <u>S5.292A</u> S5.298
790 - 862 FIXED BROADCASTING S5.312 S5.313 S5.314 S5.315 S5.316 S5.319 S5.321 ADD <u>S5.292A</u>	512 - 608 BROADCASTING S5.297 ADD <u>S5.292A</u>	585 - 610 FIXED MOBILE BROADCASTING RADIONAVIGATION S5.149 S5.305 S5.306 S5.307 ADD <u>S5.292A</u>
	608 - 614 RADIO ASTRONOMY Mobile-Satellite except aeronautical mobile-satellite (Earth-to-space)	610 - 890 FIXED MOBILE BROADCASTING S5.149 S5.305 S5.306 S5.307 S5.311 S5.320 ADD <u>S5.292A</u>
	614- 806 BROADCASTING Fixed Mobile S5.293 S5.309 S5.310 S5.311 ADD <u>S5.292A</u>	

ADD S5.292A Additional allocation: The band 470-806 MHz. except 608-614 MHz in Region 2, is also allocated to the mobile satellite service (space-to-Earth) on a primary basis. subject to agreement under Resolution 46. and is limited to use by non-geostationary satellite systems only.

Reason: New allocations are necessary in order to satisfy the needs of the non-geostationary, non voice mobile satellite service through the year 2002.

For allocation proposals concerning 1390-1400 MHz and 1427-1432 MHz, see IWG-2A/77.

## ANNEX 1

### Additional (Domestic) Justification

#### To Support the Flexible Allocation Proposal

When frequency allocations were made internationally for the first time for commercial NVNG mobile satellite service systems, the bands that were allocated were within the same bands where other satellite systems had been operating for many years. It was, therefore, relatively easy for the 1992 WARC to make allocations for shared satellite use of certain bands, primarily because there was little or no impact on a majority of the ITU countries.

In one frequency band, however, where there were existing terrestrial radio services operating within most ITU countries and where there was **NO** existing satellite usage, 75 ITU countries took a footnote exception to the mobile satellite service allocation. This occurred even though the allocation was for earth-to-space, i.e., uplink spectrum, which each country could easily control. Many countries added themselves to this allocation exception at WRC-95, and now 113 countries are part of the note.

This note now holds the record for the most number of countries in the 135-year history of the ITU. However, if any of the 113 countries ever wanted to change or remove the allocation, they could do so. Some countries are still in the footnote even though they operate satellite systems in their own country in this particular band.<sup>5</sup> However, even with this glaring exception, people were convinced that our allocations approach at WARC-92 for narrow portions of spectrum was the correct approach, because it impacted a minimum number of domestic users and because the total amount of spectrum that will be used by non-geostationary data mobile satellite service systems is relatively small.

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<sup>5</sup> One Country has 8,058 licenses for government, private and public commercial terrestrial users where they have also been operating a NVNG MSS system for the past 18 months.

At WRC-95, the U.S. took the same approach in proposing small, narrow portions of the spectrum below 1 GHz for allocation for worldwide mobile satellite service use. The bands selected were the least offensive to our existing domestic users. This approach was an attempt to satisfy both the domestic assignment/licensing processing matter and the international treaty allocations process at the same time, i.e., obtain agreement on spectrum in the U.S. first and then convince the other 184 ITU countries at the WRC. This approach was a failure because the *least* offensive bands in the U.S. were the most offensive to the other 99% ITU countries. Recall too, that the bands proposed by the U.S. at WRC-95 were within bands used only by terrestrial users as there were no more bands available where other satellite systems were operating.

This approach also left the U.S. with no flexibility at the conference when other bands were proposed because there was no agreement or mechanism to obtain U.S. clearance on these new ideas submitted by other countries. The U.S. was severely chastised for this lack of flexibility where we came into a conference expecting countries to have flexibility when we had none.

So what is the solution? Simple. The solution is to propose international spectrum allocation requirements for NVNG mobile satellite systems in the same way that requirements for other services have been addressed. That is, to return to the regular way of proposing allocations within the international arena, and then make domestic assignment decisions after the WRC. This has been the historic method of obtaining international allocations to provide needed domestic decisions at later time, which has been used by the U.S. in the ITU for many, many years.

Therefore, in order to achieve regional consensus, to achieve worldwide agreement, and to lessen the impact to our domestic users, a flexible allocation approach is suggested for U.S. international proposals for WRC-97. Adoption of sufficient bandwidth internationally in different spectrum locations will give the FCC (and NTIA) the opportunity at a later date to meet domestic requirements when and if non-geostationary data mobile satellite service system requirements materialize in the U.S.

When domestic requirements are addressed, the FCC and NTIA will be able to recognize not only domestic use but also other regional differences in spectrum use as well. The U.S. will no longer be chastised for not taking into account other worldwide requirements. Even though a band in the U.S. may be used for example, by land mobile users, that same band is probably used in other countries for other terrestrial services, such as fixed point-to-point or multi-point systems. Therefore, there is no reason to deny an international allocation which may never be implemented in the U.S. and may in fact only be used in other regions where spectrum usage is different than that in the U.S.

Experience with MSS use of the bands below 1 GHz as well as studies in the ITU-Radiocommunication sector indicate that there are operational and technical means available to facilitate sharing between non-geostationary data mobile satellite service systems and other terrestrial radio and broadcast services having allocations and operating below 1 GHz.

The sharing methods that will be used include the mobile earth (satellite) terminal being separated from the terrestrial fixed or mobile user, or by determining whether or not a channel is in use and avoiding use of that channel. The satellite system will also employ very short narrow-band data transmissions and the satellite will deliver its data at an acceptable pfd limit to the Earth's surface so as not to interfere with existing terrestrial users. Spread spectrum techniques will also be used by some systems to spread the power over a larger band thereby mitigating the possibility of harmful interference. Lower power spread spectrum techniques can best be met when the band over which the signal is spread is large. And even though some systems may use digitized speech, such use will not increase the potential for harmful interference as this will still be a data transmission.

Only much smaller portions of this allocation in different spectrum ranges are actually in use by the individual mobile services. Hence, the international allocations provide the domestic flexibility when domestic assignment/usage decisions are made after the conference.

Some 32 non-geostationary data mobile satellite service systems have been notified to the ITU. This figure does not include all of the individual U.S. systems that have applied to the FCC for licenses. It

is expected that more systems will be notified to the ITU. In order to accommodate the growing worldwide demand that will be met by these global systems and to permit competitive systems, flexible, wider allocations in several different spectrum bands are necessary. Before these systems can be implemented, they will have to coordinate use of the spectrum in accordance with established ITU regulatory procedures. Insufficient spectrum may result in systems not being able to be implemented with a resulting loss of technological lead, jobs, and new revenues in this country.

Without domestic flexibility provided through the international Table of Allocations, the FCC would not have been able to introduce land mobile cellular systems in the 800 MHz band. This mobile allocation was achieved at WARC-79, years before cellular was implemented. Also, without this international flexibility obtained at WARC-79, the FCC could not be considering today the introduction of other land mobile services for public safety needs in the 698-806 MHz band (which is allocated to both the broadcasting and mobile services in the ITU).

The requirement for commercial non-geostationary data-only mobile satellite service flexibility is no different than a U.S. government mobile satellite service which also requires international flexibility. For example, a government UHF satellite system operating in the 225-400 MHz range has some 151.5 MHz allocated internationally for this mobile-satellite service. Thus, when the government system encounters interference situations, the wider allocation approach provides the flexibility to shift frequencies to avoid such problems with terrestrial users. Also, this wider allocation approach permits several different country government systems to use this band for mobile satellite systems and to coordinate with other terrestrial and satellite users in accordance with the ITU established regulatory procedures.

The restriction in the U.S. that mobile satellite use in this band is for government users only is by choice of the FCC/NTIA regulators. There is no reason today, however, where another country might implement a commercial satellite system in the band following the established ITU regulatory procedures.

An allocation in the ITU Table of Allocations does not mean that the service will always be implemented or feasible. For example, at WARC-79, the 806-890 MHz band was allocated for the mobile

satellite service primarily because NASA (through experimental systems) believed that this band was conducive to possible commercial mobile satellite service use. Later, when that band was put into use in the U.S. by cellular systems (over the strong objections of Canada which wanted to implement MSS in the band), the U.S. withdrew its support for implementation of the mobile satellite service allocation 806-890 MHZ. As a result, the band was never implemented by the mobile satellite service.

At WRC-95, the U.S. took a footnote to the international Table of Allocation indicating that 806-890 MHZ is not available for the mobile satellite service in the U.S. (even though the international allocation remains as was originally proposed by the U.S.). Moreover, Region 3 (Australia/Asia) has an ITU allocation for MSS at 942-960 MHZ which has not been implemented.