ANALYZE OF BASIC PRINCIPLES RULING THE GEO EXPLOITATION

45th Scientific and Technical Subcommission

COMMISION FOR PACIFIC USE OF OUTER SPACE
UN-COPUOS

Libertad y Orden

DELEGATION OF COLOMBIA

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Trough ITU and other UN conferences, it is worldwide accepted that the Orbit Spectrum Resource, OSR has three main attributes:

- ***Natural Resource***: Determined by laws of the nature, being an humanity's patrimony.
- ***Not renewable***: The geostationary orbit requires a unique combination of orbit parameters, and its reproduction is beyond the human capacities.
- ***Scarce***: To avoid interferences, a minimum angular separation among GEO satellites is required, when they share operating frequencies and covered zones; therefore, the number of satellites that can be located at the GEO is limited. Hence, the spectral part of the OSR determines its scarceness.

ITU CONSTITUTION

CHAPTER II: *Radiocommunication Sector*

ARTICLE 12 (PP-98): *Functions and Structure*

1 1) The functions of the Radiocommunication Sector shall be, bearing in mind **the particular concerns of developing countries**, to fulfil the purposes of the Union, as stated in Article 1 of this Constitution, relating to radiocommunication:

– by ensuring the **rational, equitable, efficient and economical use** of the radio-frequency spectrum by all radiocommunication services, including those **using the geostationary-satellite** or other satellite orbits, subject to the provisions of Article 44 of this Constitution, and

– by **carrying out studies** without limit of frequency range and adopting recommendations on radiocommunication matters

CHAPTER VII: *Special Provisions for Radio*
ARTICLE 44 (PP-02): *Use of the Radio-Frequency Spectrum and of the Geostationary-Satellite and Other Satellite Orbits*

1- (PP-98): Member States shall endeavour to limit the number of frequencies and the spectrum used to **the minimum essential** to provide in a satisfactory manner the necessary services. To that end, they shall endeavour to apply the latest technical advances as soon as possible.

2 In using frequency bands for radio services, Member States shall bear in mind that **radio frequencies and any associated orbits**, including the **geostationary-satellite orbit**, are **limited natural resources** and that they must be used **rationally, efficiently and economically**, in conformity with the provisions of the Radio Regulations, so that countries or groups of countries **may have equitable access to those orbits and frequencies**, taking into account the **special needs of the developing countries** and the **geographical situation of particular countries**.

Because of these unique attributes, countries in ITU and other UN entities have agreed that the GEO exploitation should be:

- ***Rational***: avoiding the spoil of this scare resource
- ***Economic***: to optimize the cost associated with the OSR use, to reduce final cost to service users
- ***Efficient***: profiting as much as possible of a granted OSR
- ***Equitable***: guaranteeing the non-discriminatory access to all the countries.

But, after more than 40 years of GEO exploitation, it associated OSR has been actually used:

efficiently?; rationally?; economic?; equitable?

To answer such questions, in the last WARC-07, the Resolution 80 of the Radio Rules: ***Due diligence in applying the principles embodied in the Constitution***, was updated, with:

- **Considering g):** ***that the Legal Subcommittee of the Committee on the Peaceful Uses of Outer Space of the United Nations General Assembly has drawn up recommendations in this respect*****,**

- ***Resolves 1***:to instruct the Radiocommunication Sector, in accordance with No. 1 of Article 12 of the Constitution, **to carry out studies on procedures for measurement and analysis** of the application of the **basic principles** contained in Article 44 of the Constitution;

- **Invites 2**: **administrations to contribute to the studies** referred to in resolves 1 and to the work of the RRB as detailed in resolves 2.

This subject was considered during:

- The Conference Preparatory Meeting CPM-1 for the next WARC-11, in November 19-20 2007
- The Radio Advisory Group Meeting in February 13-15 2008

In both of cases, it was decided that Study Group 4 (satellites) of ITU-R should be the appropriate space to receive contributions related with this subject.

Results shall be review in the next CPM-2 WARC-11, in February 2011, and will be discussed during WARC-11, in 3Q 2011

Colombia has participated in all these meetings; recently, in RAG meeting a proposal for questions to be resolved by Study Group 4 was submitted:

a. What definitions should be adopted for each one of the basic principles contained in the Article 44 of the Constitution?
b. Since these definitions, which variables should be taken into account to analyze these principles?
c. To develop analytic Models to measure these basic principles that take into account the adopted (literal a) definitions, and the considered variables (literal b)
d. To carry out retrospective and prospective analysis that allows advancing measures and historical analysis of each one the basic principles.
e. To determine the correlation among the basic principles, and the impact that different events to the use of GEO have had over them.

Proposed studies road map

Definitions: to agree how to define the principles of:

- rationality
- efficiency
- Economic
- equitable access
- special needs of the developing countries
- geographical situation of particular countries

Proposed studies road map

Variables: based of the agreed definitions, to define wich variables should be included when measuring each principle:

- **Rationality**: per country: quantity of Sat, Area, Population?
- **Efficiency**: proposed vs launched satellites? TRP?
- **Economic**: cost per TRP? Final user costs?
- **equitable access**: quantity of countries?; TRP? Satellites?; launched?; available capacity?
- **special needs of the developing countries**: associated with d?
- **geographical situation of particular countries:** latitude? Tropical regions?

Proposed studies road map

STUDIES:

a. **Modeling**: integrate variables into an analytical mode

a. **Analyze**: apply models in a retrospective manner, allowing to measure each variable behavior during the more than 40 years of GEO exploitation

b. **Correlation**: determine correlation factors between variables

c. **Drivers**: to analyze breakpoints and determine possible external causes, technical, economical, regulatory, etc.

Proposed studies road map

Prospective:

a. **Simulation**: to foresee possible impact of modifications in Radio Regulations to improve the full compliance of every basic principles

a. **Proposals**: To submit the best recommendations issued from simulations to the next WARC-11

COPUOS is a very appealing scenario to debate this topic, and to contribute with the studies requested in Res. 80

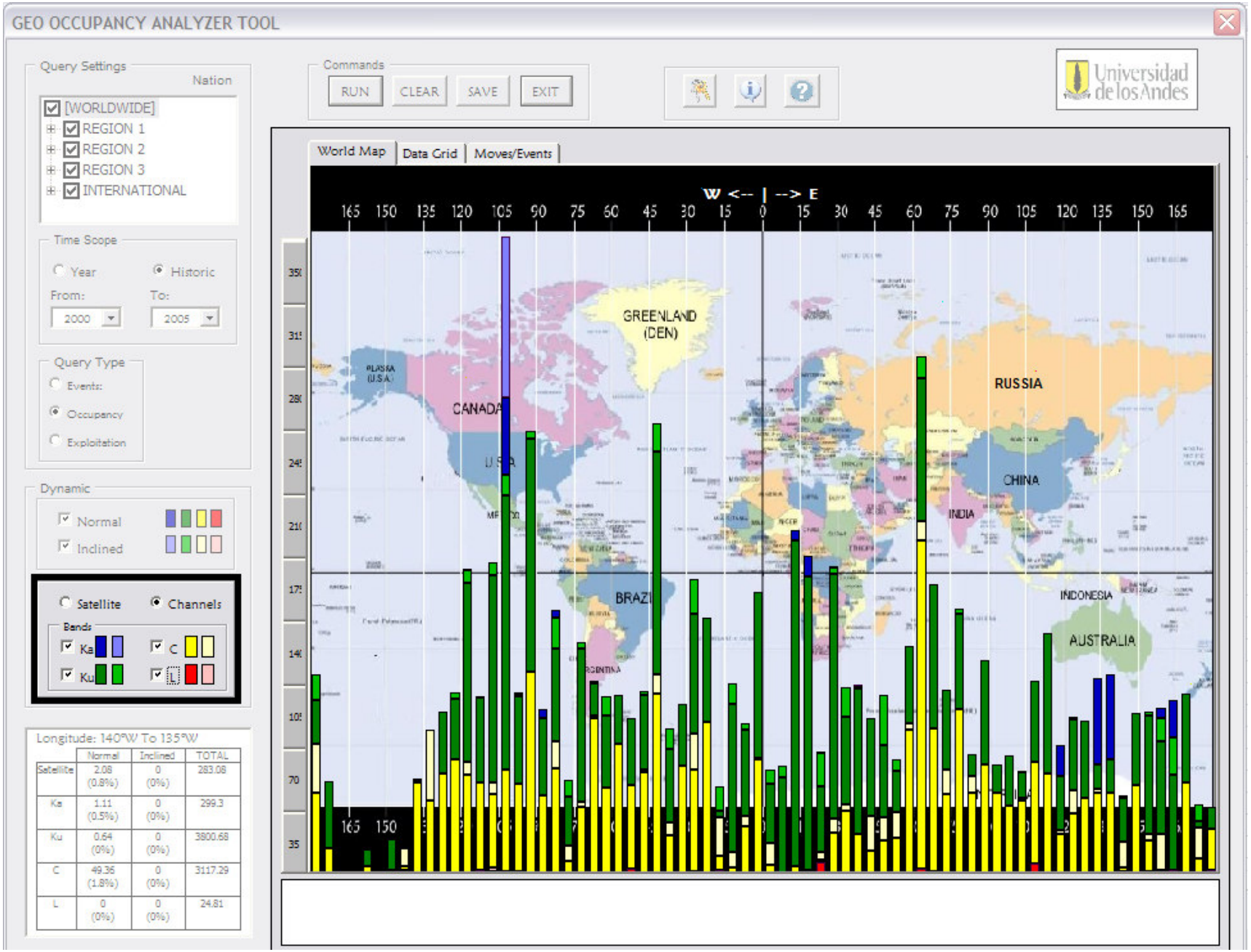
GOAT as a supporting Tool for proposed analysis

- **GOAT** (standing for "GEO Occupancy Analizer Tool"), is an Excel oriented Visual Basic application, that performs historic analysis of the GEO occupation, through queries on a satellite data base.

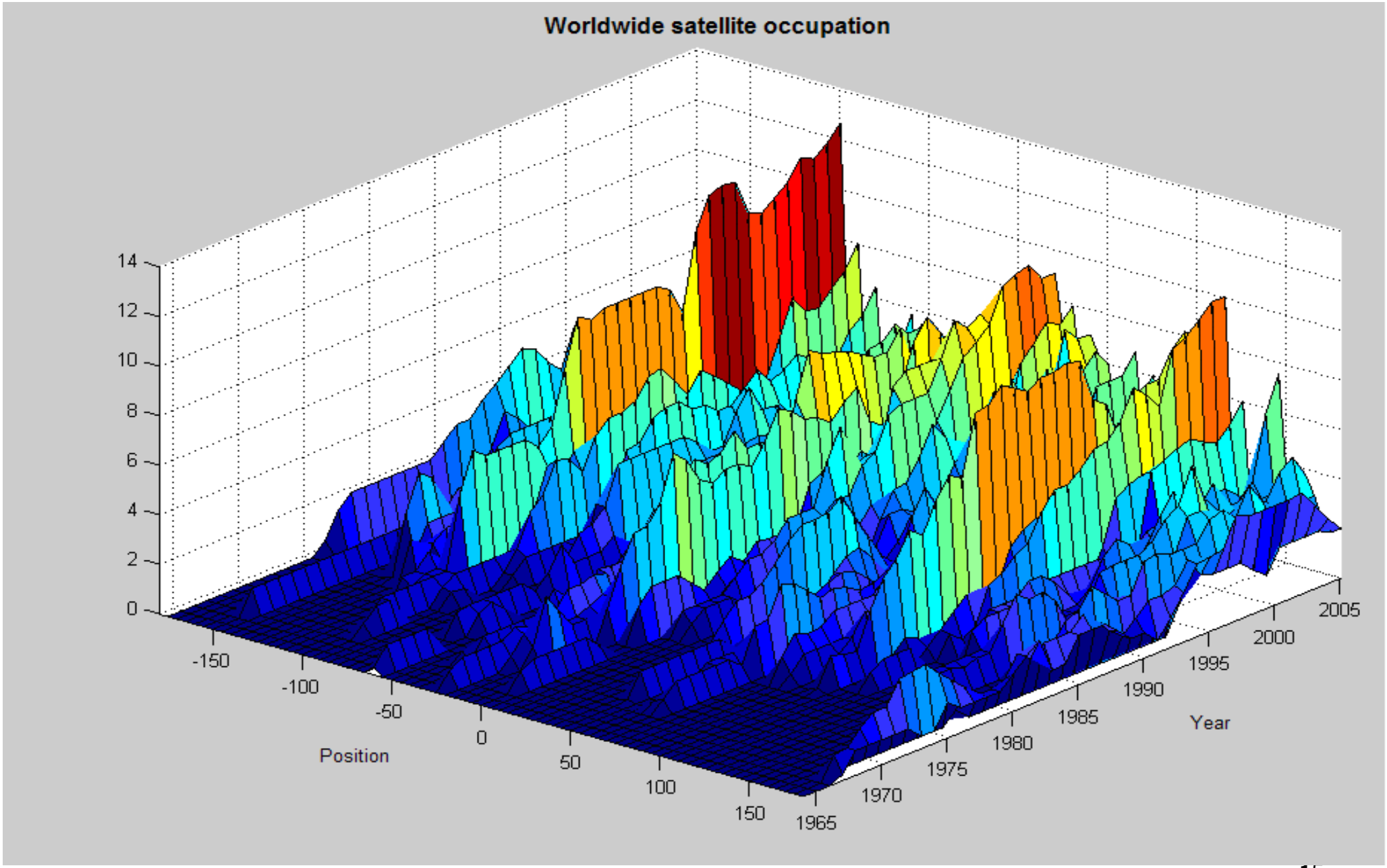
- **GOAT** might be used as a data mining tool, to provide required information and data for analyzing the basic principles ruling GEO exploitation and their associated variables and models

- **GOAT** and its data base can be enriched with cooperation of other administrations a UN entities, to contribute with the goals of Res. 80

Graphical map referenced display



Graphical variables vs Latitude display



THANK YOU..!

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