SYSTEMATIC PLANNING FOR THE MEXICAN SATELLITE SYSTEM

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ABSTRACT

A systematic planning model for the Mexican satellite system consisting of the analysis of a domestic and international satellite system was diagnosed using SWOT (Strengths, Weaknesses, Opportunities, Threats) its mission, vision, values and strategic objectives were proposed and the strategies raised by the following combinations of SWOT: SO, ST, WO and WT. Finally, the plan of action and the feasibility of carrying it out were proposed.

Based on analysis and diagnosis one of the great strengths found in the country is the development of special scientific research, but it is isolated and therefore tends to establish humanist satellite companies to promote and preserve ecology and self-finance public and mixed wealth or private initiatives that systemically integrate basic and applied science among other companies which are engaged in the design, construction and launch of satellites with the purpose of contributing to technological development. This provides an efficient, fast, safe and cheap way to meet the demands of domestic and international users.

Keywords: Systemic Planning Model, Mexican satellite system, SWOT, scientific research, technological development.

INTRODUCTION

The Mexican government considered its satellite system as a strategic area from 1985 to 1966. From that year it amended the Constitution in Article 28 to move from a strategic to a priority area and therefore the private enterprise Satmex was commissioned, which has replaced the satellites Solidaridad 2 and Satmex 5, first released in 1994, and designed for a service life of 14 years (Tun 2006) It is currently in its 19th year, and is working partially, but Solidaridad 2 is flawed. To prevent possible loss of satellite orbits, allocated by the (ITU), the Mexican Government in late 2011 announcement a Mexsat system startup which is controlled by the Ministry of Communications and Transportation (SCT), Federal government agency, and in January 2013 launched the first of three scheduled satellites, called Bicentennial, in the same orbit as Solidaridad 2 (Telecom, 2011).

The objective of this work is to avoid situations that threaten the cancellation of satellite orbits, promote public and private investment, provide an efficient, fast, safe and cheap service to meet the user demand, in line with the innovative technologies and reduce technological dependence.

To achieve the objectives proposed, a Systemic Planning Model for the Mexican satellite system which allowed analyzing and detecting the system problems; the root causes; plan the solution based on the mission, vision and values of the same; plan strategies and a prevention solution; develop the action plan and the feasibility of the proposal. This model can make decisions to improve the Mexican satellite system. This model was based on the rules, conventions and national

and international regulations related to the Mexican satellite system, to streamline the knowledge system that impacts on the country's technological development. This involves managing the political, social and economic area.

DEVELOPMENT

International Satellite System Analysis

This analysis primarily considered the following: There is inequity in the satellite orbits assigned among countries of the world (Satellite Quick Facts).

The satellite debris is polluting our planet in space, plus it is a danger to spacecraft and to the public (Piña, 2008).

The UUIT-D sector has a policy to support poor countries and emerging economies for development in communications (ITU, 03/08/2011).

National Satellite System Analysis

The Mexican satellite system has been considered as a strategic area from 1966 to 1985, a period in which services provided voice, data and video to the country. From 1977 it passed to be a strategic area a priority so it was commissioned to the private enterprise Satellites Mexicanos, SA de CV (Satmex) which provides services to the Americas (Tun, 2006).

It has four geostationary orbits and three of them have Satmex; the other company is Med Com and SES S.A.

Satellite Satmex did not replace Solidaridad 2 and Satmex 5, which were scheduled for 2011. In Jan 2013 the first satellite of the Mexican government program Mexsat called Bicentennial was put in to orbit. This action prevents the possibility of losing the orbits allocated by the ITU. The other two satellites of this program will be put into orbit in 2012 and 2013 respectively (Telecomm, 2011).

Technology transfer

Satellites used in the orbits assigned to Mexico, have been designed, built, and launched by foreign companies. This transfer of technology is very expensive, according to studies that have been made and equals about 40% more than its actual value (Charles, 1982).

Regulatory framework

The Mexican State has since the Electrical Communications Act (ECA) of 1926 the Federal Communications Act (LFC) and the Federal Law of Radio and Television (LFR and TV) in 2010 reformed the framework for communications development. However, almost always political and economic power groups benefited the people (Alvarez, 2007). Amendments to the LFC and the LFR and TV benefit Televisa and TV Azteca to the extent that Supreme Court of the Nation had to intervene (Villamil, 2012).

Scientific research

Developed countries have integrated basic and applied scientific research in business for over twenty years. Our country and the majority of poor developing countries are in the previous stage,

which consists of knowledge management and the development of scientific research (Nelcy et.al, 2007).

The Mexican State has founded primarily higher education institutions and research centers for the development of basic and applied scientific research. Scientific space development was begun in late 1957 when the Autonomous University of San Luis Potosi launched its first space rocket (Saucedo, 2011).

In the decade of the 60s the Secretariat of Communications and Transportation (SCT), launched around a dozen rockets (Méndez, 2009).
The Autonomous University of Mexico (UNAM) through the University Program Space Research and Development (PUIDE), designed and built a satellite for meteorological scientific research, which was sent into space in 1995 by the USSR (Poveda, 2009).

In order to explore the country using photography and the Ku frequency band, several Mexican institutions have been involved in the Satex project since 1993 to design build and launch a Satmex satellite (Poveda, 2009).

On March 31, 2011 the IPN Network Telecommunications Experts (polytechnic Gazette No 18.15 / 04/2011) was created and on November 24, 2011, UNAM began Network Space Science and Technology (RedCyTE) (Arreola, 24/11/2011). Both institutions develop and promote scientific research and technological development.

Mexican State agencies to develop communications

To coordinate efforts, concerns, and aspirations generated in projects and research programs in institutions, primarily colleges and research centers, the Federal Government through the SCT founded three organizations. The first was the National Space Commission Exterior (1962-1977) (Méndez, 2009). Ten years after the dissolution of this the Mexican Institute of Communications (1987-1997) was made and also dissolved (Poveda, 2009). Thirty-three years after this dissolution, in November 2011 the party's activities began with the same purpose as the previous two. The Mexican Space Agency (EMA) is a public agency dependent on SCT coordinates Space Policy in Mexico in order to develop human resources, research, technology and infrastructure needed for the country's technological development (Mendieta, 20011).

Diagnosis

To carry out the diagnosis, we apply a method to determine the strengths, weaknesses, opportunities and threats (FODA) for the Mexican satellite system.

Mexican satellite system Strengths

- The Mexican satellite system provides national and international services.¬
- The State has a regulatory communications system and particularly for the satellite system that adapts to the strategies and technologies of the time.
- The country has human resources, researchers and technologists in all areas of knowledge.
- Significant experience in the design and construction of rockets and satellites.
- The Mexican Space Agency is a management body for space research and technology.

Opportunities for Mexican satellite system

- Mexico provides international services and is likely to continue doing so.
- Mexico can continue to participate in the ITU, and participate in the international regulatory framework.
- The development Sector (ITU-D) supports the development of telecommunications in the countries with fewer resources. Our country may apply for this support.
- Mexico ITU has been assigned four geostationary satellite orbits. It has all the possibilities to conserve and manage others.
- Mexico can continue signing agreements with public and private institutions, as well as participate in meetings and forums.

Mexican satellite system Weaknesses

- Mexico has assigned four satellite orbits, approximately 1% compared to the U.S. which has 452, not counting those that have not been registered, mainly for military strategy.
- There are no businesses in Mexico for development, consulting, management, design, construction and launching Mexican satellite system.
- Mexico with a great effort can maintain geostationary satellite orbits.
- There should be autonomous bodies etc. As concessions COFETEL assign permissions to users, primarily benefiting the nation, rather than factual group interests.
- Professional human resources are generated and researchers involved in a small percentage in satellite technology development.
- There is no systemic integration of scientific research and development for satellite development companies.
- The Solidaridad 2 satellite works partially and Satmex 5 is working with faults. This implies that the satellite services are not at full capacity.
- The disclosure of our satellite technology creation is at academic level and the disclosure of its use is limited because the company has problems to replace Satmex satellites.
- There is a brain drain due to lack of opportunities for technological development.
- Strengthen economic and political groups that work primarily for their interests.
- Lack of in basic and applied research.
- Deterioration of ecology and environment.

Threats to the Mexican satellite system

- Mexico may lose satellite orbits assigned by the ITU.
- Garbage pollutes the space satellite and earth and threatens astronauts and satellites.

DISCUSSIONS

Why have we failed at least three times in the space question? What have the three previous failures in common? (Poveda, 2009).

All these frustrations have been individual projects concerning very few people and not the result of a state policy (Poveda, 2009).

The disappearance of CONEE and IMC shows that the policy of the Mexican government is not continuous, has no direction; if you do not know where to go you will get nowhere. Consequently

there is no course in higher education institutions and research centers, as rightly mentioned by Poveda. With the cancellation of PUIDE it shows they do not know how to build a satellite.

We have over 70 years of space research and there has been no technological development in this field and this is because there is no connection between scientific research and technological development.

To have this connection, as Poveda says, we need a state policy.

Proposal for satellite technology development

The Mexican government as regulator of the economy and national policy conductor, correlated with international policy can promote public and private investment to fund self-financing satellite companies that generate wealth, which can be public, mixed or private initiatives that systemically integrate the basic and applied scientific research, among other companies which are engaged in the design, construction and launch of satellites, in order to provide an efficient, fast, safe and cheap service to meet the demands of domestic and international users.

Below is the mission, vision and values of the proposal:

Mission

Interface with the system of national and international communications to provide innovative satellite services. Foster the emerging satellite companies and integrate research, development and technology management in them, to create, transfer, disseminate and use satellite technology. Strengthen through the Mexican satellite system national security, technological infrastructure for efficient communications coverage in all regions of the country; ecological, cultural and social educational programs.

Vision

Companies. Generate profitable companies that offer people, professionals and researchers, graduates of educational infrastructure in all areas of knowledge, the opportunity to participate in the technological development of the Mexican satellite system to reduce technological dependence and impact on the political, economic and social development of our country.

Rationality. Achieving results with the right resources

Values

Integrity. Act and communicate with responsibility, honesty and transparency within and outside the workplace.

Aspiration. Acting with passion and sense of urgency, impose challenges and achieve goals and objectives. Make decisions wisely, without fear of error or failure.

Human Resources. The reason for organizations should be the welfare, pleasure, nourishment in the company human resources who will work efficiently and effectively, considering the contributions of each member of the ecosystem approach seeking a common goal.

Natural Resources. No company is justified without being careful to improve the ecology and environment.

Overall strategic objective

- To contribute to the technological development in the country.

Particular strategic objectives

- Integrate technology management research and development in the satellite companies.
- To provide, innovative, efficient, effective, quality service at low cost to public and private, national and international institutions as well as individual users.
- Integrate people, professionals and researchers to develop satellite technology.
- Promote the development of ecology and environment.
- Provide nourishment, training, welfare services, cultural, etc. for human resources.

Strategies for the development of the Mexican satellite system

To propose strategies, we use the following combinations of SWOT: SO, ST, WO, WT.

Strengths opportunities (SO)

- Mexico's regulatory framework, international related will contribute to solving global issues and international satellite technology development.
- Apply mainly for ITU-D support to channel our resources to develop our country's satellite technology.
- The Mexican Space Agency is responsible for promoting aerospace technology development in Mexico and represents the SCT internationally.
- If we have satellite technological development it is possible to disclose our creation and use of technology to the world.
- The Mexican satellite system will continue to provide international services.

Strength threats (ST)

- Mexico participates actively in international organizations, therefore it should use aid resources of ITU for satellite technology development, otherwise it is dependent on foreign technology and therefore vulnerable and at risk to losing one or more satellite orbits.
- The Mexican satellite system development must take into account the trash satellite and ecology, for that reason Mexico should make proposals to the ITU to assist with the countries concerned to solve these problems.
- If the human resources that the country has are not channeled towards technological development of the country, they will seek opportunities in other countries and will continue to have growing political, economic and social problems.
- Mexico has the resources to develop technologically if not it will be subject to the interests of transnational corporations and countries in addition technology transfer costs about 40% more than its actual cost.

Weaknesses Opportunities (WO)

- Mexico can use ITU support mainly in the development sector (ITU-D) to facilitate the development of satellite development companies.

- Mexico can participate in ITU forums though its opinion carries little weight.
- Currently with much effort geostationary satellite orbits are maintained due to technology imports increasing by 40% of the actual price. With the long-term technology development cost are lowered and a lighter satellite can be designed.

Weaknesses Threats (WT)

- With satellite development the nation is assured of four geostationary satellites allocated by the ITU and is in a position to obtain others.

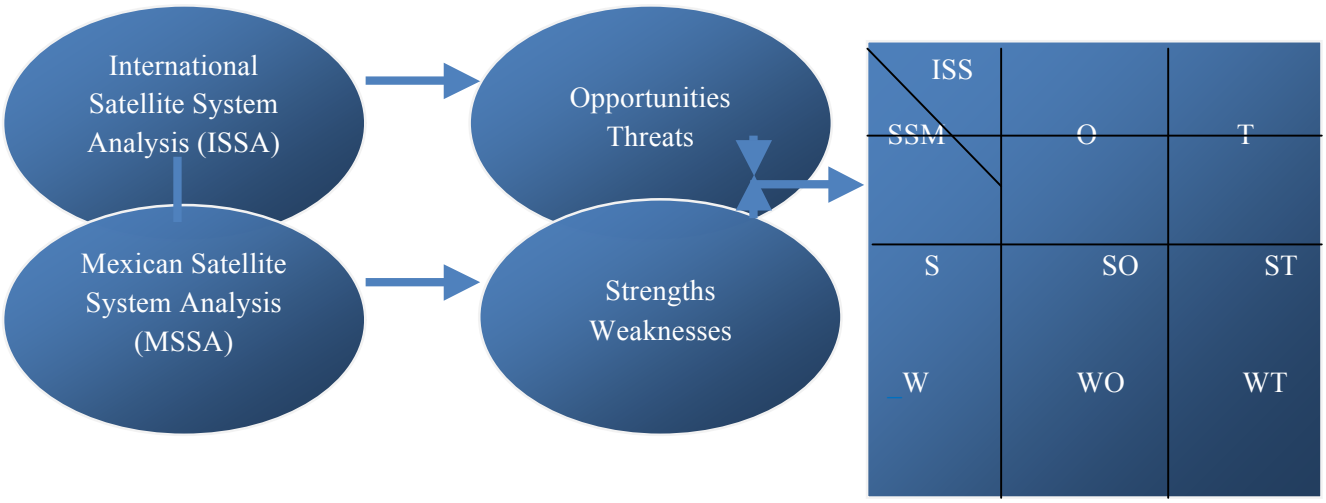

Figure 1 Model for system diagnosis and guide strategies to guide you, using the SWOT.

Strategic Action Plan for the development of Mexican Satellite System international

- Make international agreements with nations and different public and private institutions, primarily with space agencies to develop a system of networking and cooperation, with a mutual benefit to establish policies related to generating basic and applied scientific research. Also the creation, dissemination, transfer and use of technology in the field of satellite communications in particular, enhancing innovation and ongoing review of the international regulatory framework that contributes to technological developments, political, economic, social and the ecological development of our nations.

- Participate in various forums, meetings and international working committees relating to space communications to actively participate in the development context of the international satellite system and to address problems including the hazards of waste and ecological deterioration caused.

National Strategic Action Plan

Establish agreements with public and private institutions and governments of the States of the Republic to generate business for the creation, dissemination, transfer and use of technology in the

area of satellite communications in order to contribute to technological development, political, economic and social development of our nation.

Resources to carry out the strategic plans

- Mexico has human, physical and natural resources for satellite technology development.
- The SCT and their associated autonomous and dependent organ such as the Federal Communications Commission and the Mexican Space Agency are responsible for the management of communications technology in Mexico and in the world in the international and national regulatory context.
- Our country has excellent professionals and researchers in all areas of knowledge including engineering, technology management, systems thinking, management, economics, design and development, etc.
- Mexico has higher education institutions in public and private which generate basic and applied scientific research in all areas of knowledge necessary for technological development.

Feasibility of strategies

International Feasibility

Mexico may request the support of Telecommunication Development Sector (ITU-D). This area was created to help spread equitable, sustainable and affordable access to telecommunications and, thus promote greater economic and social development in nations and companies and especially the poorest countries (ITU, 08/03/11). Membership offers the opportunity to work with the best talent in the industry, represented by more than 700 private sector entities in addition to 193 governments that make up the UN and its regulators. Participation in the process of ITU standardization allows directly influencing the technological forces that decide the future of the ICT industry (ITU, 08/03/11).

National Feasibility

The legal framework for telecommunications in which the Mexican satellite system is implicit began with the Electrical Communications Act of 1926 to reform the LFT and LFR and TV in April 2011, reflecting the changes of the Mexican state, from a state controller to a state regulator.

To foster technological development in communications the Mexican government should at least greatly reduce the regulatory framework following practices:

Throughout the history of the Mexican government communications with honorable exceptions primarily benefited the powers which are groups of political and economic powers who work primarily for their own interests and to a lesser or greater extent some public officials have been involved. This statement of the reasons can be inferred from the administration of President Lazaro Cardenas, which enacted the General Communications (LVGC) published on February 19, 1940 in the DOF. This same document notes that: In the past constructed means of communication has been authored without sound and appropriate planning which tends to benefit the great national interests and not the property interests of dealers.

On April 11, 2006 reforms by the Chamber of Deputies to the Federal Telecommunications Law (LFT) and the Federal Radio and Television (LFR and TV) were approved by a group of Senators who introduced a constitutional motion against these reforms expressing various concepts of

disability provisions thereof considered in violation of the Constitution. The Supreme Court's Office decided to invalidate several of these precepts. This outlawed the partnership Televisa and TV Azteca in exchange for promoting the interests of a small group that manages the political and economic power of the country (Villamil, 04/26/12).

The Mexican State has founded colleges and public and private research centers in which scientific research has developed in all areas of knowledge. Space research cannot exist without the correlation of these areas. Space science research has led to the founding of organizations to coordinate, promote and support projects (Mendez, 2009). Such organisms generated by the federal government are: the CONEE, IMC and AEM. The first two have been considered failures (Poveda, 2009). In addition to these failures are the Satex project abandonment and the disappearance of PUIDE (Poveda, 2009). This is due to a lack of state policy which has caused projects to be individual or groups of researchers (Poveda, 2009).

To make the connection of scientific research with satellite technology development it is necessary to do so through companies. These businesses need to integrate scientific research as systemically as it was over 20 years ago when it started in developed countries (Nelcy.op.cit).

Companies are formed by individuals and these are who make the changes, but these changes are resistant. Kotter and Cohen in their book: "The emotional, hard core of transformation", suggest that however good the strategic plan, if there is no belief in the possibility of change, uncertain feelings of fear, distrust, etc.., are interposed. The key to success or failure of change initiatives is never strategy, organization or procedures but changing the behavior of people which in turn, depends directly on their feelings. See, look, feel, and think to change is the first fundamental law of change which will not happen if we stay in the process of viewing and analyzing. Figure 2 shows the planning model for Mexican Satellite System.

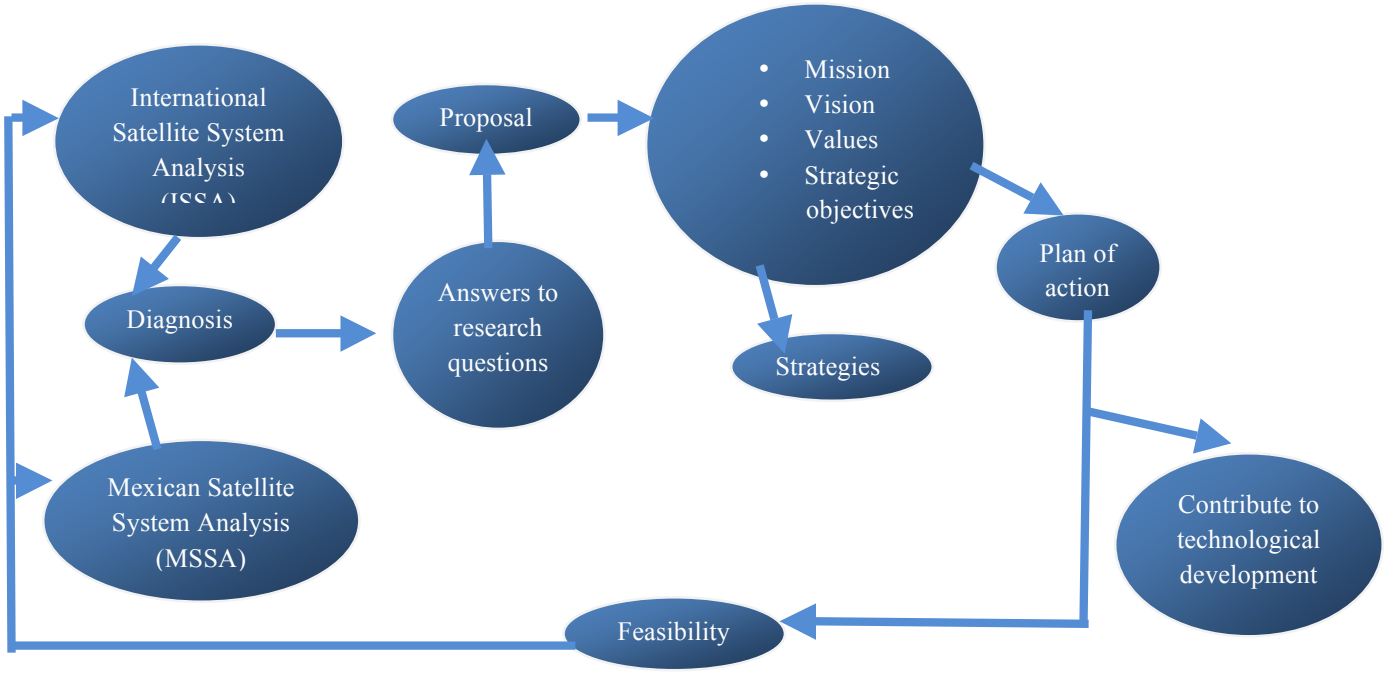

Figure 2 Model of Systemic Planning for Mexican Satellite System Design.

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