Brazil's SIVAM: As it Monitors the Amazon, Will it Fulfill its Human Security Promise?

By Thomaz Guedes da Costa

Abstract

As Brazil implements its System for Vigilance of the Amazon (SIVAM), the country's leadership continues to tout the system as a major effort towards achieving its national security objectives—especially (a) preserving the country's sovereignty over its territories in that tropical forest region; (b) assisting in Amazon law enforcement, particularly in deterring illegal flights associated with contraband and narco-trafficking; and (c) providing environmental information aimed at promoting sustainable development and the preservation of natural habitats in the Amazon. But while official arguments promise SIVAM will contribute to all three objectives, the lack of: (a) transparency in the program's development and implementation; and (b) greater participation by non-official organizations in how SIVAM will gather, process, and disseminate information threatens the environmental and human security value of the system.

For at least the past decade, significant political actors, opinion-makers, and the general public (both in Brazil and overseas) have paid unprecedented attention to the Amazon region. They are primarily concerned with: (a) environmental protection of the area (as it becomes the backdrop for accelerated social and economic development); (b) exploration of natural resources; and (c) criminal activities with transnational implications. Reacting to internal and external calls for more efficient governance of the region, the Brazilian government argues that the country's new System for Vigilance of the Amazon (SIVAM) will, when fully implemented, play a key role in supporting the coordination of Brazilian federal policies in the region. Specifically, SIVAM is expected: (a) to help ensure Brazil's sovereignty over its portion of the Amazon; and (b) to provide greater means to generate geophysical, biological, and social data about the region as well as to improve the quality of sustainable development decision-making there.

Since 1985, the Brazilian government has been repeatedly shaken by contraband and security problems in the region and on its borders with other Amazonian countries such as Colombia and Venezuela. As a result, Brazilian authorities have wished to expand the country's national air traffic control system (SINDACTA) into its Amazonian region. But a lack of investment funds and the dauntingly large area that would have to be covered by radar (equal to that of Western Europe) delayed such an expansion.

Finally, a series of factors spurred the political will to launch SIVAM. First, as Brazil's developmental policies in the Amazon became the object of increasing foreign criticism and as the carbon dioxide cycle was linked to global warming, Brazil's federal authorities proposed a System for the Protection of the Amazon (SIPAM) at the 1992 Rio Conference. SIPAM began with a drive to map the region precisely as the first step towards establishing the Amazon as a zone in which economics and ecology would be balanced. Simultaneously, Brazilian law-enforcement authorities demanded greater control of the region's air traffic because of the growth of illegal drug-trafficking and cross-border smuggling fights in the early 1990s. But the decisive factor in the acceleration of SIVAM's development was the United States' intensified push to curb drug production and smuggling from Colombia, Peru, and Bolivia by air detection and interception of suspect aircraft. As an immediate consequence of such operations conducted by the

Thomaz Guedes da Costa is an associate-researcher with the Mamirauá Institute for Sustainable Development, Tefé, Amazonas, Brazil. Dr. Costa is also a professor at the Center for Hemispheric Defense Studies of National Defense University, Washington, DC, where he directs the Defense Planning and Resource Management course of study.

United States and other countries in the arch from Venezuela to Bolivia, Brazilian President Fernando Cardoso issued a directive in 1996 to impede access of non-authorized flights across Brazil's northwestern border and to articulate the defense of its portion of the Amazon in reaction to strategies observed in neighboring countries (Presidential Directive, 23 February 1996).

SIVAM: Components, Goals, and Development

SIVAM is a complex combination of: (a) fixed, mobile, and airborne radar; (b) ground sensors; (c) telecommunication networks; and (d) computerized data collection and information management structures.[1] Accusations by opposition parties and the press of fraud and legal mismanagement in the initial contract bid process for SIVAM caused delays and protracted political difficulties for the program. But the first contract was finally launched in March of 1997, and first operations are estimated to begin in late 2002. Raytheon is the prime contractor for the ground technical segment, which will include up to 13 air traffic control sites and six mobile radars. The aerial portion is supplied by Embraer, a Brazilian aircraft manufacturer. It includes: five Embraer ERJ-145SA planes equipped with Ericsson's Erieye phased-array radar; three ERJ-145RS planes for monitoring natural resources exploitation and environmental missions; eight to 12 weather radar stations; and a variety of water and ground sensors and stations as well as communication facilities and three regional information processing centers (at Belém, Manaus, and Porto Velho). Air patrol in the region will be conducted mainly by Tucanos ALXs procured from Embraer.

Authorities—particularly in the Brazilian defense sector—are promising to use SIVAM to provide Brazil with the overall means: (a) to monitor human movements and activities and their impact on the Amazon; (b) to increase knowledge about the region's environment, biodiversity, climate, and geophysical features; and (c) to protect the Amazon's environment while promoting local economic development there. The first sketchy conclusions about SIVAM's effectiveness will be drawn as parts of the system become operational, are tested, and acquire full capability.[2]

The SIVAM program was born in a politically powerful crib in the mid-1990s, as issues of economic development in the Amazon region clashed with environmental concerns. Despite the existence of SIPAM, there was no clear national strategy in Brazil to protect the Amazon. The general perception was that market forces would continue to sustain those large agricultural projects and migratory movements that were putting at risk the ecology of the region without providing even remedial assistance to local communities and their traditional development (Silva, 1999). While a large number of Brazilian congressional representatives from the Amazon states were optimistic about SIVAM and its possibilities to bring investments to their region, the program's early history saw many controversies and much ambiguity—harsh battles over contracts, accusations of kickbacks and inside information, and bureaucratic disputes that marred its technical conception and purposes. The results of a Brazilian Senate investigation of irregularities in the early stages of purchases by SIVAM's contractors did not dispel the cloud of "shady deals" hanging over the program (Zaverucha, 1995). Additionally, as construction of the program's radar stations and sensors has moved ahead, cost overrun and conflict of interests have come under investigation by Brazil's Union Accounting Court (Fortes & Krieger, 2000).

Tangled by accusations of management wrongdoing, the program has thus far shown little to confirm its promise to provide useful environmental information to the scientific research community. Indeed, from SIVAM's inception, national security concerns of the Brazilian executive branch (first at the defunct Secretariat for Strategic Affairs and later the Ministry of Defense) have politically controlled the initiative.[3] This control has created a contradictory image. The most visual elements of SIVAM thus far belong to the Air Force air defense project. Nevertheless, SIVAM's proponents have accentuated its environmental protection capabilities in order to secure loans (particularly from within Brazil and from

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Brazil and Neighboring States

Source: National Geographic Society

international "green money" lenders) and to justify expenses for the project. Of the total twenty-year SIVAM budget of US $1.395 billion, the Export-Import Bank of the United States is financing 73.3 percent through the Bank of Brazil. Raytheon is financing 17.1 percent, and the Swedish Export Credits Guarantee Board (EKN) is providing Ericsson the other 6.1 percent. This is an interesting combination of funding partners for a program that has promised to prioritize environmental monitoring along with conventional air defense and law enforcement needs.

Although future analysts will be able to assess the program and review the issues surrounding its political installation, this article aims to raise awareness of the *need* for evaluation of the objectives and implementation of SIVAM in its human security aspects. In particular need of evaluation are the program's promises to increase scientific knowledge about the regional environment in order to inform sustainable development policies. Due to the absence of open sources regarding how SIVAM will gather, process, and analyze data, it is very difficult for an outside observer to elaborate extensively on the program. Current public information about SIVAM's progress is limited. But one ought to at least start asking questions both about the transparency of the program and the criteria for evaluating the Brazilian government's commitment to using SIVAM for not only national security but also for environmental data-gathering and social objectives.

This article relates each of the initial stated aims for the program and then attempts to sketch out how SIVAM is or is not addressing these aims. First, the article addresses the issue of the program as *an instrument for Brazilian national defense*. SIVAM is primarily an air traffic control system to support air reconnaissance and interdiction; yet its formulation differs remarkably from the approach adopted by proponents of the Integrated System for Air Traffic Control and Air Defense (SISDACTA).[4] Second, the article then (a) examines the "green" (environmental) arguments that authorities continuously use to justify the program, and (b) comments on the uncertain prospects for SIVAM as *a knowledge generating mechanism for both economic development and environmental preservation of the Amazon region in*

Brazil. It is the author's contention that such a mechanism would demand a model of openly providing and exchanging data with the scientific community. Finally, the article concludes that it is uncertain at best whether the well-established security purposes of the project can successfully coexist with its environmental management possibilities. The major risk is that the program will systematically generate data that may not "fit" the scientific needs of research programs. This mismatch would compromise SIVAM's ability to contribute to the scientific knowledge as well as the human security of Brazil's Amazonian region.

SIVAM as an Instrument of Brazilian National Defense

From a historical perspective, SIVAM is a continuation (although under a different conceptualization) of SISDACTA. SISDACTA was an ingenious solution to the difficulties of integrating air traffic control for Brazil. Implemented in the 1970s and 1980s, it is a four-part air traffic control system that covers most of Brazil except for the Brazilian Amazon and Northeast regions.

SISDACTA resulted in efficient air traffic surveillance in southern Brazil. It evolved with the natural growth of Brazil's civil and commercial aviation and the need for effective air traffic control. And for two decades since its implementation, federal public investments in SISDACTA were made steadily and parsimoniously, without significant technical or political challenge. Under the aegis of the Ministry of Aeronautics (which is commanded by the Air Force), the program's authorities have imported radar and communication hardware mainly from France (particularly from the company Thomson-CSF), integrated the hardware with local software development, and produced a "dual-use" system. While SISDICTA is now the integrated civilian and commercial air traffic control mechanism for most of Brazil, it also provides a sophisticated and versatile air defense system (complemented by F-103 Mirages and F-5s air interceptors) for about 50 percent of the Brazilian air space. By the late 1980s, only the Amazon region had not been brought under SISDACTA. SIVAM will, in fact, become upon implementation the newest segment of this national system of air defense.

"Command and Control" of the Amazon

One of the key arguments for SIVAM is that the system will enable a more effective presence in and control of the Amazon region by the Brazilian state. The system's proponents insist that it will provide better information dissemination within the government, enabling authorities to then take more efficient action. President Cardoso has affirmed:

> The SIVAM will be our eye on the Amazon. It will supply information about deforestation and therefore make it possible for us to combat illegal activity more effectively. . .With SIVAM we will no longer have any excuses. Brazilians will have to take account of their responsibility as guardians of the world's largest rainforest (Gamini, 2000).

The region's scant population and long boundary lines with neighboring countries amidst impregnable or unfriendly tropical forest have made for permeable borders and unchecked trespassing.

The Brazilian Amazon covers about 5.2 million square kilometers (km), roughly the size of Western Europe or the continental United States from its eastern shores to the Rocky Mountains. Forests make up about 4 million square kilometers of the region. For the Brazilian federal government, this area is a well-defined geographic unit that has been the object of public subsidies in investments and special legal regulation—the so-called Legal Amazônia. With a population density of about three inhabitants per square kilometer, with almost 60 percent of its population residing in urban areas, this region presents many challenges to government and those interested in social development of the local population. Its scant population and long boundary lines with neighboring countries amidst impregnable or unfriendly tropical forest have made for permeable borders and unchecked trespassing. Of Brazil's 16,500 km of land borders, 10,948 km is in the Amazon, running from French Guiana, Surinam, Guyana, Venezuela, Colombia, and Peru to Bolivia (four times the distance between

Madrid and St. Petersburg) (Dreifuss, 2000). On the Brazilian side, there are 11 federal states and 570 municipalities.

These enormous dimensions feed the Brazilian nationalistic imagination in many ways. Alexander López has argued that these preoccupations have two facets: "The first one refers to the nature of the physical space, and the second relates to the international valuation of the physical space" (López, 1998). Most contemporary Brazilian strategists or opinion-makers (exposed to values proposed by the geopolitical thinking that dominated the country's elite during the twentieth century) share the notion that the Amazon is a natural asset reserved for Brazil and that this asset helps to define the country's national power.[5] The prospect of SIVAM as an information generator about the region satisfies this mindset: the system is intended to permit Brazil to concentrate resources where needed to exclude other powers from the region as well as to expand the transformation of the Amazon's natural resources into wealth for Brazilians.

In fact, over the past five years, a new set of expectations for SIVAM's air traffic control capabilities and data generation have been hammered into the general public by the key government agencies, especially the Air Force. For example, at a government seminar in Brasilia, Ambassador Ronaldo Sardenberg—then Brazil's Minister for Special Projects at the Presidency—argued that SIVAM will attend to many political aspects of national interest, such as:

> (a) the intense application of high technology that will change the face of the Amazon; (b) the integration of government in the federal, state, and municipal levels, involving Ministries and many other specific programs such as the Calha Norte,[6] the Economic Ecological Zoning and the Border Area Assistance to Municipalities; (c) the establishment of a very broad agenda for the region, from the integration of the Defense Ministry, the Ministry for Environment, the Ministry of Education, and the Ministry for Special Projects; and (d) the generation of new products as, for example, the addition of the Pro-Amazonia to the Promotec[7] that could generate results of dimension superior to that of SIVAM (Centro de Estudos Estratégicos, 1999, page 4).

At the same seminar, the Brazilian Minister of Environment, Mr. José Sarney Filho, argued strongly for those features of the system that would permit air traffic control to aid in environmental protection, territorial defense, and curbing criminal activities. These two messages are representative of the Brazilian government's aspirations for the project; therefore, these aspirations must also serve as a guide for future evaluation criteria.

The interest in implementing SIVAM on grounds of national security arises primarily from the notion that Brazil's sovereignty is at risk from (a) foreign covetousness (*cobiça*) of the Amazon territory, (b) illegal cross-border activities, and (c) other potential consequences of conflicts currently observed in neighboring countries (such as Colombia). This overall argument for sovereign "command and control" is the catalyst mobilizing internal political support within the federal government for funding SIVAM. Simultaneously, the environmental monitoring and sustainability arguments have been persistently presented to the Brazilian political spectrum (both members of Congress and opinion-makers) to justify the program's costs and to generate legitimacy.[8] In the words of SIVAM Chief Director Brigadier General José Orlando Bellon,

> the problem with the Amazon has been that the state has not been able to make its presence felt sufficiently. SIVAM is a response to those who say we have not taken proper care of the Amazon. It will help us in the task of fostering renewable activities that will preserve the forest and clamp down on destructive forces (Gamini, 2000).

The idea that foreigners covet the Amazon has its roots in the continued interpretation of some events in 19th century Brazilian history, when agents of several foreign powers are reputed to have had schemes for taking control of the potential riches hidden under the tropical jungle cover. This view continued into the 20th century with the questioning (by politicians as well as agents of foreign governments) of Brazil's capacity and will to retain, develop, and protect its Amazonian territory.[9] Today, this concern is still shared across the Brazilian political spectrum. Both the Brazilian Navy Commandant Chagas Telles and Deputy José Genoíno (member of the opposition Labor Party) share the view that foreign political interests want to take advantage of Brazil's vulnerabilities and challenge the country's sovereignty in the region by posing arguments to internationalize the lands in the Amazon ("Forças Armadas," 2000; Genoíno, 2000). The notion is also strongly held in

many opinion-making circles within the Brazilian security sector.

As pollution and environmental destruction and degradation increase in many other places worldwide, this mindset has combined with increasing global demands on and for natural resources to sharpen the suspicion of many Brazilians. Many believe that foreign powers will indeed seek to exploit and control resources in the Amazon. For example, the Amazon Basin retains approximately 20 percent of the fresh water available in the world. As the distribution of and access to potable water become increasing challenges to public managers in many areas of the world, the notion that Amazon water is valuable and exploitable (even siphonable) by foreign powers has become common currency among those Brazilians sensitive to such potential challenges. There are also arguments that foreign scientists, firms, and governments will undertake illegal research in the Amazon and gather its species without authorization in order to garner secret Amazonian jungle marvels that will eventually cure diseases and provide the key to human youthfulness, among many other benefits.

Many Brazilians believe that foreign powers will indeed seek to exploit and control resources in the Amazon.

The Rise of Illegal Activity

But the issue of scientific discovery and ownership—voiced by local populations, scientists, and businessmen—might also actually be a legitimate concern and not merely a political banner used by government authorities or hysterical nationalistic voices. In fact, a broad spectrum of increasing illicit activity across the permeable borders and sparsely populated areas of the Brazilian Amazon also fuels the country's growing concerns regarding governance among the local populations, government authorities, and others interested in the region. These transnational criminal activities are increasing as the Brazilian state continues to have difficulty fully exercising its presence in and authority over the region.

For example, gold and diamonds are being smuggled through Brazil's border with Guyana as an increasing number of Brazilians cross into that country to prospect for minerals. Numerous small aircraft flights between Brazil and Venezuela or Brazil and Colombia are going untracked. And the expansion of drug-trafficking practices from Colombia as well as the growth of other illicit and widespread activities in the Brazilian Amazon are placing pressure on Brazil to assert its control. Key among these activities are: (a) illegal occupation and exploration of soil and resources on private, reserve, and other federal lands; (b) criminal activities such as non-authorized mining and minerals trade; (c) logging and smuggling of precious wood; (d) capture and trade of bio-assets; (e) small arms trade; and (f) trickling migration.

Although such activities existed until now without a major "national security" reaction from the authorities, the recent growth of drug trafficking has exposed lawlessness in many parts of the region and revealed the Brazilian government as too weak to counter these challenges. Human movements by ground, river, and air are now an essential part of a picture that includes Brazil in the Colombian internal struggle and international drug problem. The particularly active presence of the United States in its "war against drugs" in Colombia as well as the U.S. demand for trafficking interdiction in transient areas in the Amazon has provoked calls in Brazil both to improve its law enforcement and to coordinate those actions with neighbors.

The Amazon's integrity has thus become not just a question of law enforcement but also an issue of security. Brazilian authorities plan to use SIVAM to map areas of human presence and activities as well as movements and settlements—legal or illegal. This information would then be fed to police and other state authorities in an effort to better repress illegal activities. Brazilian authorities hope that SIVAM's expected combination of detection, interception, and authorization for destruction will (a) deter air shipment of illegal drugs through Brazil, (b) prevent the country from sinking further into this strategic regional problem, and (c) reduce incentives for Brazilians to break the law and join drug-trafficking activities. These goals will provide a wide field of criteria for evaluating the program.

SIVAM's remote-sensing and surveillance aircraft certainly provide FAB with a new level of technology and operational capacity. Once fully operational, SIVAM will provide FAB with a capacity for conventional interception operations (at least detection and vectoring) that the Air Force has argued it has

lacked to date—thus addressing the perceived need for anti-drug operations over the Amazon region. A Brazilian federal law enacted in 1998 gives the country's president the authority (including delegation down the chain of command) to order the destruction of any aircraft that does not respond to identification requests or obey air traffic control instructions as it moves into Brazilian airspace.[10] This authority, a key feature of a future implementation of interception operations under SIVAM, is equivalent to measures enacted by Brazil's neighbors and could be an instrument of coercive measures against drug air trafficking. The new airborne early warning capability associated with the modernization of FAB's interceptors in the coming years will also provide Brazil with unmatched conventional warfare air defense in the region, fulfilling the long-held Brazilian Air Force aspiration for much greater combat effectiveness.

The additional possibility of foreign guerrillas moving across Brazilian borders—especially from Colombia—and seeking sanctuary, logistic support, or political sympathy offers yet another justification for SIVAM. Guerrillas could harm Brazilian citizens, challenge authorities, and even recruit locals to their cause. In addition, the issues of hot pursuit, operations close to Brazilian territory by Colombian military forces, or unauthorized flights into Brazilian airspace (especially by the United States) create concerns for and pose challenges to Brazilian sovereignty. These prospects underlie the interest that the FAB has had in commanding the overall SIVAM program since its inception. As previously noted, program funds have been earmarked mostly for the purchase of hardware such as aircraft and radar. This equipment addresses the FAB's demands for surveillance systems of the region as well as for modernization. In theory, the system's dual-use capability allows for both detection of illegal flights of small aircraft and for environment monitoring of real-time events (such as forest fires) or for mapping and assessing deforestation, land use, or forest coverage changes. But although promotional rhetoric for the program indicates that it will also install many environmental sensors, the operational specifications of these sensors or what type of data they will provide remains unclear.

In traditional national security terms, therefore, SIVAM could provide great improvement for Brazil's preventive measures and repressive mission control in the Amazon (both for police and for conventional military forces). It also is a symbolic response to threat, expressing Brazil's will to take effective control of its sovereignty over the Amazon and to defend it more efficiently. But the project also demands a new logic in foreign affairs and defense policy: it will need to respond to the perception that Brazil is procuring weapons systems that might upset a conventional arms balance with its neighbors or break the region's confidence-building atmosphere that has come so far in the last decade.

Generating Knowledge for Development and Sustainability

The second fundamental measure of SIVAM's effectiveness refers to the repeated official promise that the program will be a significant generator of data and information for (a) local and regional management, and (b) the integration of the region into Brazil's efforts at economic development and environmental preservation. In a 1999 statement to the Brazilian Senate on the purpose of SIVAM, Brazilian Minister of Defense Dr. Élcio Álvares said:

> The purpose of the SIPAM (The System for Protection of the Amazon)/SIVAM project is to integrate, to evaluate, and to disseminate *conhecimentos* (knowledge) that can permit global and coordinated actions of government agencies in the Amazon Region in order to take advantage of its resources. The project will contribute mainly to environmental protection, control of land occupation and its use, surveillance and border control, prevention and fight against endemic and epidemic diseases, civil defense, identification and combat of illicit activities, protection of indigenous peoples' lands, and control of air traffic, river movements, and others (Álvares, 1999).

In order to meet the goals listed by Minister Álvares, the system will have to strive to generate and disseminate information to be used by other sectors. If this is the key argument to justify and gather political support for the program, then SIVAM's relationships with consumers of its data should be a basic avenue for evaluating its effectiveness. Other authorities have also emphasized that information from SIVAM can and will be used for better governance and social progress in the region (Centro de Estudos Estratégicos, 2000).

But consultations between SIVAM officials and the program's potential consumers (such as governing

authorities, bureaucrats, scientists, investors, individuals, and nongovernmental organizations) have to date been few or very narrow. Those that have occurred have certainly been not at all the kind of exchanges that will help establish the epistemological model necessary to link data generated by SIVAM with the information demanded by these potential consumers. As SIVAM is essentially managed by the Air Force with extensive supervision by the Defense Ministry, the traditional military culture of secrecy and self-sufficiency may well result in the autonomous and closed development of the project—with further secrecy standards, new information flow filters, limited research and development opportunities, and only a few technological partners/contractors (and these mostly from abroad). The Brazilian law and security enforcement subculture also may have reduced the project's transparency and information dissemination in the name of preserving the level of secrecy required for "national security" or law enforcement missions. The major issue is that the Air Force will control the flow of the information to other parties, including to organizations outside the security community. How this will be done is not clear. Therefore, an objective assessment of SIVAM's effectiveness of the information generation procedures and their use may not be possible at this point.

However, there is little evidence to date to show that the Brazilian government will be able (a) to integrate SIVAM with other information platforms or programs in the region, (b) to develop the expected multi-program articulation for local socioeconomic development, or (c) to induce SIVAM's managers to focus on anything other than the program's output for national security.

Indeed, there is currently silence from the Brazilian government on how to link these ends. As Gilberto Câmara has pointed out, there is a lack of clear evidence that SIVAM's "technical reasoning" (its hardware and logistics) is being matched by an effort to lay down tracks for "interpretative reasoning" of the climate, biodiversity, and human security data and information the program promises to deliver. Câmara has suggested that the engineering nexus of the program has failed to include the contributions of individuals and agencies outside the circles of the Air Force and its foreign technological suppliers. For Câmara, SIVAM is conceived of as a centralized information processing system run by the military—a concept that contrasts with the non-hierarchical networking features now afforded scientific discourse by the Internet. The Internet counters the traditional lack of Brazilian interagency interaction as well as the lack of information exchange between the Brazilian government and non-official organizations; it also takes advantage of existing networks already in place for data generation about the region. If SIVAM were to adapt the Internet as its tool of exchange, Câmara argues, the program would generate an extensive information base that could be analyzed by proven methodological instruments (Câmara, 1999). The basic disconnection between SIVAM and the need for scientific data is that no one knows if the data generated is what scientists need. In contrast, a project such as the Large Scale Biosphere-Atmosphere Experiment in Amazonia-LBA has been developed in an integrated fashion with a diverse number of research projects (Project LBA, 2001).

The basic disconnection between SIVAM and the need for scientific data is that no one knows if the data generated is what scientists need.

Past Failures and Integrative Weakness

The integration of other federal programs in the Amazon region has already met with failures in the past decade. For example, SIPAM was to be a strategic umbrella concept for a "holistic" protection of the region. But SIPAM has never made any progress and in fact has been rejected by all bureaucracies; not even the Office of the Presidency has been able to find a proper "fit" for the idea. Its coordination was finally moved to the Defense Ministry in 1999, running the risk that SIPAM's "protection" mandate may now take on a "national defense" connotation. Its logic could now be subordinated to the actual physical implementation of SIVAM.

This recent history of civilian inability to harness resource allocation and full implementation of "sensitive" programs in the Amazon continues. The Border Area and the North Arch, two other federal projects initiated by the same Secretariat for Strategic Affairs, have now also either lost support of the executive or been taken over by the Defense Ministry for administration and funding. Interagency coordination is a central issue that President Cardoso

recognizes as he calls for greater integration, for instance, regarding the need to protect against fires in the region (*"Presidente,"* 2000). But fragmentation has been the dominant feature of federal programs for the Amazon, and this will continue to be a challenge to SIVAM's effectiveness.

The potential effectiveness of SIVAM could also be hindered if it is not vertically integrated with local and state governments. Since 1988, the Brazilian constitution has limited the actual authority of the federal government to command a centralized policy; greater power has been given to states and municipalities. The Brazilian Amazon has nine federative political units with governors who control local politics and take advantage of a disproportionately superior representation in the National Congress. This devolution of power has hindered the balance that can be struck in the Amazon between local social development (driven by local politicians) and environmental protection efforts committed by the federal legislation and programs. Yet such a balance is becoming increasingly critical as market forces and new programs provide stimuli for new Amazonian economic ventures and continued traditional clearing of jungle areas for agriculture.

The vast areas of the Amazon, the limited means of transportation and communication available there, and the difficulties in setting up logistical infrastructure in the region have been factors limiting the intrusion of human presence. But migration into the Amazon continues. Consequently, federal investments, subsidies, assistance, and spending in the region that would address the need for environmental protection have suffered from budgetary limits, from bureaucratic disputes over scarce political attention, and from bottom-up exercises of local and state-level politics in the actual allocation of resources. Corruption scandals such as those under investigation in SUDAM (a major public agency for economic project financing in the Amazon) also dampen confidence in the role of the public sector to manage effectively the region's policy.

A Lack of Bridging

SIVAM's other potential environmental disappointment regards its actual production of data for environmental monitoring. For example, the project promises to fund 200 stations to monitor water resources and 20 to monitor weather. But what more information will SIVAM provide than that already produced by other government agencies such as the National Institute for Space Research (INPE), the Ministry of Agriculture's weather service, or the Brazilian Institute for Natural Environment (IBAMA)? Such inconsistencies and redundancies cloud the prospects for SIVAM as an effective tool for conservation.

> The knowledge produced by a SIVAM oriented towards human and environmental security could even change perceptions about the scope of threat to the region—broadening it beyond organized crime or border control to include the possibility that human presence may destroy the ecology of the Amazon through unrestrained deforestation.

As noted above, little evidence is also available of effective bridging between scientific proposals and the project's information modeling process. As Valter Rodrigues points out, the "sustainable development standards" SIVAM is supposed to be promoting have yet to be determined (Rodrigues, 2000). While one may find news from SIVAM that it is linking the project's development with significant institutions in the scientific community in Brazil, the only evidence of these links is the promotion on SIVAM's official Web site of regional seminars between the project's core administration and local research institutions to "transfer technology" and "develop joint projects." The scope and impact of such common efforts are left unspoken (SIVAM, 2001).

And contrary to the claims of SIVAM's managers that there is increasing scientific participation in shaping the project, there are in fact important major scientific absences. The Internet home pages of organizations such as the Brazilian Council for Scientific and Technological Development (CNPq) (Conselho Nacional, 2001), the Brazilian Society for the Progress of Science (SBPC) (Sociedade Brasileira, 2001), or Brazil's National Academy of Science (ABC) (Academia Brasileira, 2001) give no news of their respective involvements with SIVAM.[11] If SIVAM is to become a valid tool for scientific knowledge to assist sustainable development in the region, the

participation of leading nongovernmental entities such as these should share both the burden of the intellectual logic of the system and the specification for scientific information needed.

In addition, if international cooperation is a mainstay in the conduct of Brazilian foreign policy in the Amazon region, what role does SIVAM play in support of this aim? This is another unanswered question regarding the information on and sharing of SIVAM's technology and "know-how." Given the great products the system is projected to provide, it would be helpful to extend participation and sharing of ideas with neighbors, even in the conception phase. But again, no significant efforts in this regard are identifiable.

The knowledge produced by a SIVAM oriented towards human and environmental security could even change perceptions about the scope of threat to the region—broadening it beyond organized crime or border control to include the possibility that human presence may destroy the ecology of the Amazon through unrestrained deforestation. The generation of knowledge regarding strategic human, group, and international interactions in the Amazon will have little utility unless it includes scientific information about the region's natural cycles and the management of its human presence with environmental sustainability efforts.

The Need for Broader Perspectives

Perhaps the greatest contribution made thus far to broadening the definition of security in the Amazon comes from an unexpected quarter: Senator Marina Silva, who represents the Brazilian state of Acre. She is a *cabocla*, a former farm worker who, after making her livelihood from extractive activities in the jungle, became a labor leader and then a representative both in the state house of Acre and later in the Federal Senate. Ms. Silva has a different perspective on security in the Amazon:

> [I]n relation to the Amazon, as an asset threatened, I believe that one of the most important and significant threats we experience results from wrong policies implemented after the end of the extractive cycles and the introduction of models centered on large [agricultural] projects. The threat results from misleading perspectives. The first mistake is to consider the Amazon as an empty demographic space. The second mistake is to consider the Amazon as a homogenous forest. The third mistake is to think of development in the Amazon and not of the Amazon. Development in the Amazon makes us think of defense policy in the Amazon as large projects in the Amazon, as actions of government in the Amazon, instead to think of a process of endogenous development, where the Amazon [environment] itself can generate its own responses. From this matrix of misleading perspectives results a series of mistakes that causes the Amazon [region] to be seen, not only by us *Amazonidas*, but also by all Brazilian people and even by those from abroad, as a [natural] asset under threat. The idea of such large projects produced the destruction of 13,000 km^2 [of forest] burnt in [1998]. If we continue at this destructive pace, in thirty or fifty years, and this is the truth, there will be no more Amazon [forest]. I am not the one affirming this, but these are the conclusions of technical research from alternative sources and from those conducted by the government through official research institutes themselves [such as INPE] (Silva, 1999).

The concept guiding SIVAM is a clever and practical approach both to preserving Brazil's sovereignty and law enforcement and to generating information for social and scientific development. As a result, it will vastly increase Brazil's air defense capabilities for both conventional and classic air defense as well as for law enforcement. But SIVAM's implementation risks being deficient for environmental purposes because of its uncertain model of information gathering and dissemination. Probing (a) how this model is set, and (b) how it could eventually function in harmony with information needed for scientific development and local management are keys to ensuring SIVAM's success as a tool for environmental security. As the program stands, however, SIVAM's full utility as an instrument for human security in the Amazon region is being endangered by the lack of transparency in its conceptualization and implementation. How the evaluation process of the program evolves is a key to its success in meeting the expectations of the Brazilian taxpayers, citizens, and others concerned with the protection of the Amazon as a unique and significant natural environment on the planet.

Endnotes

[1] For detailed information provided by the administrators of the program, see "Raytheon" (2000).

[2] As of May 2001, the first ERJ-145s had been delivered and are under operational testing, regional centers were being constructed and equipped, and first radars were under experimental testing.

[3] Representatives of the Labor Party have echoed the doubts expressed by the Brazilian Society for the Progress of Science (SBPC) with regard to the project's relative lack of Brazilian technology suppliers. For example, Senator Eduardo Suplicy has argued that "scientist members of SBPC are warning that SIVAM…could avoid spending US $1.438 billion dollars, as proposed by Raytheon, and [could] be undertaken [for] US $927 million using both national industries and technology" (Suplicy, 1996).

[4] In the early development of SISDACTA in the 1970s, the absence of an effective air control system (especially for commercial aviation) made it politically easy also to construct an intelligence component to the program, yielding a "dual-use" system.

[5] The classical Brazilian geopolitical views are fundamentally derived from Couto e Silva (1967).

[6] The Calha Norte ("North Arch Project") is an effort to increase state control in the border region from the Atlantic coast to Peru. Since most federal agencies, particularly the Ministries of Education, Health, and Economy, do not assign priority to investments or to posting officers in that region, Calha Norte has evolved to be a Brazilian Army-run administration. Local municipalities are assisted with sanitation, health, education, and management activities. Financial resources have been continuously shorter than actual budgetary demands.

[7] Pro-Amazonia and Promotec are programs run by the Ministry of Justice to increase law enforcement in the Amazon region.

[8] For arguments emphasizing the environmental promises of SIVAM, see for example the words of Brigadier General José Orlando Bellon, SIVAM's Chief Director, in "SIVAM funcionará" (1999).

[9] The perception that there are forces or conspiracies that want to internationalize Brazilian Amazonian territory has been part of the Brazilian political vocabulary for some time. The United States is considered a key conspirator in this reputed Amazonian internationalization effort. Advocates of Brazilian vigilance against such an effort identify U.S. Navy Captain Mathew Fawry's suggestion in 1817 to the U.S. Secretary of State about forming a sovereign country in the Northern Amazon as the first overt manifestation of U.S. interest in controlling the region**.** Between 1989 and 1992, many indirect and direct comments of U.S. officials (such as those of then-Senator Al Gore challenging Brazil's sovereignty in the region) have given credence to the perception of this threat. Original documentation regarding these allegations is not forthcoming. No primary sources are provided by those who hold these fears. But references to the past feed present arguments, and periodically new fears are raised as the issue reappears on the agenda of strategic debates in many circles—especially in more nationalistic ones such as the Escola Superior de Guerra and its alumni associations throughout the country, or the Military Club, a social club of retired military officers in Rio de Janeiro. The arguments are presented by Chagas (1997).

[10] For the transcript of this law and comments on it, see Correia (2000).

[11] For the official argument of current scientific participation, see Site Oficial (2001).

References

Academia Brasileira de Ciêcias (National Academy of Science). (2001). [On-line]. Available: http://www.abc.org.br/

Álvares, Élcio. (1999, November 16). "A Amazônia—patrimônio ameaçado?" [The Amazon—asset under threat?]. Comissão de Relações Exteriores e Defesa Nacional, Senado Federal, Secretaria-Geral da Mesa, Subsecretaria de Taquigrafia, Serviço de Comissões, SC-2. Author.

Câmara, Gilberto. (1999). "O projeto SIVAM e a biodiversidade Amazônica: Há espaço para a ciência nacional?" [Project SIVAM and biodiversity: Is there space for the national science?]. Paper presented at the annual meeting of the Brazilian Society for the Progress of Science (SBPC), pages 1-4. [On-line]. Available: http://www.dpi.inpe.br/gilberto/sbpc.html

Centro de Estudos Estratégicos. (1999). *As Dimensões do SIPAM/SIVAM na Região Amazônica.* [The dimensions of SIVAM/SIPAM in the Amazon region]. Brasília: Centro de Estudos Estratégicos.

Chagas, Carlos. (1997, June 5). "Querem internacionalizar a nossa Amazônia." [They want to internationalize the Amazon]. *Manchete*. [On-line]. Available: http://brasil.iwarp.com/chagas.htm.

Conselho Nacional de Desenvolvimento Cientifico e Technológico (National Council for Scientific and Technological Development). (2001). [On-line]. Available: http://www.cnpq.br

Correia, José Aparecido. (2000). "Pena de morte, em vôo." ["Death penalty in flight"]. In *Revista Brasilieria de Direito Aeronáutico 81*. [On-line]. Available: www.sbda.org.br/revista/Anterior/1690.hrm

Couto e Silva, Golbery. (1967). *Geopolítica do Brasil* [Geopolitics of Brazil]. Rio de Janeiro: José Olympio.

Dreifuss, Renné. (2000). "Strategic perceptions and frontier politics in Brazil." In Anthony Hall (Ed.), *Amazônia at the crossroads* (pages 215-232). London: University of London Institute of Latin American Studies.

"Forças Armadas temem internacionalização da Amazônia." [Armed Forces fear the internationalization of the Amazon]. *O Estado de São Paulo*, 11 June 2000. [On-line]. Available: http://www.estadao.com.br/agestado/nacional/2000/jun/11/115.htm

Fortes, Leandro & Krieger, Gustavo. (2000, December 4). "Segredos da floresta" ["Forest's Secrets"]. *Revista Época*. [On-line]. Available: http://epoca.globo.com/edic/ed04122000/brasil1a.htm

Gamini, Gabriela. (2000, December 19). "Race to Save Amazon Basin." *The Times*. [On-line]. Available: http://forests.org/archive/brazil/rasaamba.htm

Genoíno, José. (2000, June 8). "Acordo militar e política de defesa." *O Estado de São Paulo*. [On-line]. Available: http://www.estado.com.br/editorias/2000/06/12/pol140.html

López, Alexander. (1998, September). *Environment, security and conflict: Exploring the links in the Brazilian Amazon*. Paper prepared for annual meeting of the Latin American Studies Association, Chicago. Author.

"Presidente: Código Florestal deve assegurar preservação da Amazônia." [President speaks: Forest code must assure preservation of the Amazon]. (2000). [Online]. Available: http://www.radiobras.gov. br/presidencia/palavra_1505.htm

Presidential Directive. (23 February 1996). [On-line]. See reference to this classified document at: http://www.planalto.gov.br/publi_04COLECAO/PRO9618.HTM

"Raytheon: SIVAM: Background and benefits." (2000). [On-line]. Available: http://www.raytheon.com/c3i/c3iproducts/c3isivam/sivam01e.htm

Rodrigues, Valter. (2000). "SIPAM." Paper presented at the seminar "Brazil's SIVAM Project: Implications for Security and Environment Policies in the Amazon Basin." Washington, DC: The Latin American Program and the Environment Change and Security Project, The Woodrow Wilson International Center for Scholars. Author.

SIVAM: Eventos. (2001). [On-line]. Available: http://www.sivam.gov.br/INFO/eventos.htm

"SIVAM funcionará como um Banco Genético." [SIVAM will work as a genetic bank]. (1999). *Mérito. Revista do Superior Tribunal de Justiça 1*(2), 16-19.

Silva, Marina. (1999, November 16). "A Amazônia – patrimônio ameaçado?" [The Amazon—asset under threat?]. Comissão de Relações Exteriores e Defesa Nacional, Senado Federal, Secretaria-Geral da Mesa, Subsecretaria de Taquigrafia, Serviço de Comissões, SC-2. Author.

Site Oficial do Projecto Sivam. (2001). [On-line]. Available: http://www.sivam.gov.br/info/press.htm

Sociedade Brasileira Para o Progresso Da Ciências (Society for the Progress of Science). (2001). [On-line]. Available: http://www.sbpcnet.org.br/

Suplicy, Eduardo. (1996, January 19). "SIVAM: Quem avisa amigo é" [SIVAM: A friendly warning]. *Folha de SãoPaulo*. [On-line]. Available: http://www.senado.gov.br/web/senador/esuplicy/publicacoes23.htm

Zaverucha, Jorge. (1995). "The SIVAM affair." [On-line]. Available: http://lanic.utexas.edu/ilas/brazctr/publications/papers/zaverucha/sivam.html.