

## THE BRAZILIAN LAW #10.821: COMPENSATION FOR THE FAMILIES OF THE VICTIMS OF THE ALCANTARA DISASTER

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### ABSTRACT

On 22/Aug/2003, the Alcantara Launching Center (ALC) in northwest Brazil was the scene of one of the biggest disasters of the space era. From the beginning of its space program in the seventies Brazil had never had a single casualty, but on August 22<sup>nd</sup> twenty-one lives were lost all at once in a tragic accident. Brazilian legislation did not cover specific criteria for compensating victims from accidents caused by space objects. Article 7 “a” of the 1972 United Nations Liability Convention states that the Convention “*shall not apply to damage caused by a space object of launching to a national of that launching State*”. One of the meanings of such a statement is that States which carry out space activities should be able to deal with their internal matters. Thus, on December 18, 2003 the Brazilian Law #10.821, which grants compensation for material damages to the families of the victims of the ALC disaster, was issued<sup>1</sup>. This paper presents the criteria for compensation which were established in the Brazilian Law #10.821, providing

comparisons with: international air law; bilateral or multilateral agreements, such as the Intergovernmental Agreement on the Space Station; and methods adopted by other States that undertake space activities. Since the Brazilian Law #10.821 is applicable just for the ALC case and all of the victims were employees of the Brazilian Government, some considerations regarding the need to develop more comprehensive space legislation in Brazil are also presented.

### THE INVESTIGATION OF THE ACCIDENT

Just after the ALC disaster, the Brazilian Government designated a technical committee to investigate the causes of the accident<sup>2</sup>. The committee was composed of 38 members: a President, 22 Brazilian experts, 6 Russian experts<sup>3</sup>, one representative from the Brazilian Science Academy, one representative from the Brazilian Society for the Progress of the Science, one representative from the Brazilian Society of Physics, 2 representatives from the families of the victims, and 4 others. The work was divided into 4 subcommittees: 1) the meteorological factors subcommittee; 2) the material factors subcommittee; 3) the operational factors

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subcommittee; and 4) the human factors subcommittee.

On 16/March/2004, the Brazilian Ministry of Defense presented the final report of this investigative technical committee. Several failures in the conditions and procedures adopted in the launch campaign of the Brazilian Launch Vehicle - BLV<sup>4</sup> were identified.

The meteorological factors subcommittee concluded that meteorological conditions on the day of the disaster did not contribute to the accident, although there was a lack of suitable technical infrastructure in ALC. The meteorological radar, for instance, was not working on the day of the disaster.

The material factors subcommittee concluded that one of the engines of the first stage of the BLV<sup>5</sup> had self-ignited irregularly. The ignition of the engine was started by a failure in the detonator system. According to the subcommittee, such an abnormal ignition might be triggered by an electrostatic discharge. Although the actual cause of the detonator system malfunction remains unknown, the material factors subcommittee stressed that such a failure could have been avoided if a simple mechanical safety device had been installed.

The operational factors subcommittee analyzed the general procedures of the launch campaign, including safety measures, the ALC infrastructure, the BLV project design, and its technical specifications. The subcommittee found deficiencies in the maintenance of the ALC infrastructure. It was also determined that technical and safety procedures were not strictly followed during the launch campaign. The detonator system, for instance, should not have been installed until all

other systems had been checked. Also, the teams should not have been working in the launch vehicle at the same time.

The human factors subcommittee presented a wide range of difficulties related to the restricted budget for the BLV project and subsequent low salaries, lack of caution despite the high risks of the campaign; and lack of coordination among the teams involved in the campaign.

The final report did not present a definite cause for the accident; but it did emphasize that there were innumerable problems which must be addressed before the next launch campaign.

Commenting on the report, the Brazilian Professor José Monserrat Filho wrote: *“Dedication, enthusiasm, and optimism cannot be restricted to the technicians, engineers and researchers who are involved in the project. It is necessary for institutions, authorities, and politicians also to be motivated. The national space policy should be a sound and vigorous reality, and not a mere intention. It is time to implement a system that is able to reflect confidence. Brazil should not stand for a lack of commitment. It will be difficult to overcome this current scenario, but new mistakes may be avoided, new investments may have better utilization, and new targets may be reached.”*<sup>6</sup>

### **THE BRAZILIAN LEGISLATION**

National regulation for space activities in Brazil has been provided by the Brazilian Space Agency – BSA, that has issued two directives: 1) Directive # 27, of 20/Jun/2001, regarding licensing for launching of space objects from Brazilian territory; and 2) Directive # 5, of 21/Feb/2002, regarding authorization for launching of space objects from

Brazilian territory. Both Directives establish that insurance is needed for carrying out space activities in Brazilian territory, unless those activities are carried out by the Brazilian Government. According to those Directives the insurance premium should be set by BSA. However, in the ALC disaster, since the activities were being carried out by a Governmental entity, insurance was not contracted due to the existing loophole. All the victims were employees of the Brazilian Government; so, according to the national law which deals with their rights and obligations<sup>7</sup>, their spouses continue receiving victims' salaries, as long as the wives live.

However, this payment was not considered to be enough, taking into account the loss of life. Such an extreme loss needed to be further compensated. Thus, on 18/December/2003, the Brazilian Government issued the Law # 10.821, which grants compensation for the families of the victims of the Alcantara disaster.

The Law establishes that the compensation will be paid proportionally to the family members. Wives, for instance, will receive 50% and sons and daughters up to 21 years old will receive 50%. If the victim was single, his parents will receive 50% each<sup>8</sup>. The amount of compensation is settled case by case, but the criteria is the same: the last salary of the victim is multiplied by the number of years remaining before the victim would have been 65 years old. The Law also establishes that the compensation will be paid in one lump sum that will not be less than R\$ 100,000.00<sup>9</sup>. Financial support for educational expenses is also granted to sons and daughters of the victims. According to the Law, sons and daughters will receive R\$ 400.00<sup>10</sup> monthly until they are 24 years old. Law #10.821 also

foresees that the amount of compensation will be proportionally reduced if the Government is convicted by the Brazilian court.

The Brazilian Law #10.821 can be considered a step toward the development of national space legislation, because it granted a prompt compensation for the families of the victims; without it, victims' families would only have had civil law as recourse. If the case was discussed in a court, the families could spend months or even years in judicial proceedings before receiving any compensation.

### COMPARATIVE LAW

In this section, the criteria for compensation established by the Brazilian Law # 10.821 will be compared to other legislation, such as, the international air law, national legislation from other States that have carried out space activities, and existing international agreements.

#### International Air Law

According to the Brazilian Professor Sylvio Mario Brasil<sup>11</sup>, liability is the cornerstone of the air law, because it is very difficult to pre-establish sums for damages and losses. If a passenger does not accept the established values, he may extend the limits by negotiating a side agreement with the carrier. Hence, there is no specific value for compensating the passenger or his family, but a suggested amount, *ex lege*, for covering damages and losses in cases of death or injury.

The Brazilian Air Code – Law # 7.565, of 19/Dec/1986 – establishes the amount of 3.500 Brazilian Treasury Notes – around US\$ 7,000.00<sup>12</sup> – as compensation for a passenger's death or injury. This amount is much less than was

provided to the Alcantara victims' families.

Since Brazil has not ratified the 1999 Montreal Convention, in the case of international flights, the rules of the 1929 Warsaw Convention, with the amendments introduced by the 1955 Montreal Protocol, are applicable. The amount established by the Warsaw Convention in the case of a passenger's death or injury is US\$ 10,000.00.

Brazil is expected to ratify the 1999 Montreal Convention within the upcoming months. The proposal is currently being discussed in the National Congress. This Convention is already in operation internationally, establishing the carrier liability in the amount of 100,000.00 Special Drawing Rights (SDR) – around US\$ 150,000.00 - which is much more than the compensation defined by Brazilian Law # 10.821.

### **Legislation from Other States**

China, Russia and the United States have all sent a man into space, providing a good standard for comparison with Brazil's legal framework for space activities.

### **The Chinese Legislation**

Mr. Wenjuan Yin presented a study of Chinese space law in the United Nations/Republic of Korea Workshop on Space Law, on Nov/2003<sup>13</sup>. He found that *"efforts were initiated around 1994. Nevertheless, more comprehensive work went ahead only after 1998, when the Chinese Government carried out reform on the administration system of industries. China's National Space Administration (CNSA), as the competent authority for national space industry and civil space activities, is responsible for*

*preparing space legislation, formulating policies for space industry and technology, making plans for space development and setting standards in this area"*. He also states that *"space legislation is among the highest priorities on the agenda of CNSA and a special task force is established for this purpose"*.

So far, however, no legislation has been adopted. So compensation for damages or losses is regulated by Chinese civil law.

### **The Russian Legislation**

During the same 2003 Workshop, Prof. Rick Lee<sup>14</sup> dealt with Russian legislation, finding that it states that *"the private operators are liable to the government as well as domestic victims for damage resulting from their space activities"*; it also states *"a guarantee on the part of the Russian Government for compensation for direct damage resulting from space activities and imposes liability on the private operators either absolutely, in the case of damage on the surface of the Earth, or to extent of fault in the case of damage caused in outer space"*.

Article 30 of the Russian Federation Law on Space Activities states that compensation for personal injury or damage to the property *"shall be payable by the organization or citizen which has taken out insurance to cover its liability for damage, in the amount and in accordance with the procedures established by the Civil Code of the Russian Federation"*.

Rick Lee emphasizes that the guaranteed compensation payable by the Russian Government is limited only to direct damages, reflecting the former Soviet view that indirect damages are not payable under the Liability Convention<sup>15</sup>.

## **The North-American Legislation**

According to Rick Lee, the laws of the United States do not specifically require the private operator to compensate the government on private claims for damage under international law. The Commercial Space Launch Act 1984, for instance, chooses not to pass on the liability to the private operator but instead requires the private operator to obtain insurance for the Federal Government.

The Australian Professor remarks that *“the United States law does provide for a statutory ceiling in the amount of insurance or financial responsibility required, being US\$ 500,000,000 for third party claims and US\$ 100,000,000 for claims by the Federal Government in relation to damage or loss of government property resulting from a licensed space activity. This ceiling may be lowered further if it can be demonstrated that the maximum liability insurance on the world market at reasonable cost is less than US\$ 500,000,000. Except in cases where the damage resulted from the willful misconduct of the licensee, the United States Government would pay for claims arising from damage caused by licensed space activities up to US\$ 1,500,000,000 as adjusted for inflation since January 1989. In other words, the Government would accept liability on behalf of the private operator for liability up to US\$ 1,500,000,000, part of which was to be indemnified by the launch operator’s insurance policy”*.

## **International Agreements**

As for liability, international agreements, such as the 1988 Intergovernmental Agreement on the International Space Station – IGA - has contemplated the “cross-waiver of

liability” clause, which means, that each part is committed not to present any judicial claim against the other. In the case of damage or loss each part will accept their losses. IGA’s Article 16 (1) states *in verbis*: *“The objective of this Article is to establish a cross-waiver of liability by the Partner States and related entities in the interest of encouraging participation in the exploration, exploitation, and use of outer space through the Space Station. This cross-waiver of liability shall be broadly construed to achieve this objective”*. Afterwards, Article 16(3) explains that the cross-waiver shall apply to any claims for damage, whatever the legal basis for such claims against: (1) another Partner State; (2) a related entity of another Partner State; and (3) the employees of any Partner State or related entity.

However, such a clause does not have any effect in terms of avoiding claims from natural persons. According to the Brazilian Constitution, for instance, any person is able to submit his claims to court. So, the IGA commitment is not extended to Brazilian citizens, including those who may be involved in space activities.

This is a rule which is true worldwide. It is important to remember that Article VIII (1) of the Liability Convention foresees that *“a State which suffers damage, or whose natural or juridical persons suffer damage, may present to a launching State a claim for compensation for such damage*. Notice that a natural person may present a claim to any launching State and not necessarily to the one where he was born, has lived or has been working for. In this context, an employee from a subcontractor, for instance, may present a judicial claim against any Partner State. However, due to the “cross-waiver of liability” clause, if

the Partner State is convicted, it may recover its losses through presenting an administrative or a judicial claim against the Partner State that was responsible for contracting that mentioned employee.

On 14/Oct/1997, Brazil signed an Agreement with the United States to develop some items for the International Space Station. Article 14 of the Agreement also foresees the "cross-waiver of liability" clause in the same conditions as those which were established in IGA.

### SOME CONCLUSIONS

The ALC disaster focused the Brazilian authorities' attention on the national space program. They realized that much had been done despite many adversities. They realized how important space activities were, especially for a developing country like Brazil. The Brazilian Government promised to go ahead with its national space program, including the BLV project<sup>16</sup>.

Currently, space activities in Brazil are regulated by Directives from BSA. With reference to current Brazilian space policy, the Netherlander Prof. Franz Van Der Dunk wrote: "*In the summer of 2001, with the Administrative Edict No. 27, Brazil became the ninth nation worldwide to establish a national space law in the narrow sense of the word – an act focusing exclusively on space activities and prominently including a system for encapsulating private participation in such activities within the state's jurisdiction, international responsibilities and international liabilities. After five Western states, two former communist nations and the special case of South Africa, Brazil may pride itself on being the first proper developing state taking such a fundamental step*".<sup>17</sup>

Of course, Brazil should be proud of having established rules that will be useful for developing space activities in its territory. However, the need to develop Brazilian space legislation still remains.

The Brazilian Ministry of Science and Technology, BSA, and even private entities, such as the Brazilian Association of Air and Space Law – SBDA - have the expertise to elaborate sound national space legislation. The heroes from Alcantara deserve that.

Brazilian Law # 10.821 was definitely a step toward such national space legislation. However, its effects are restricted to the Alcantara case. It is necessary to develop comprehensive national space legislation which will cover future situations like the one that occurred in ALC.

Such a law might set ceilings for insurance premiums, according to the risks involved in a launching campaign. Since the Brazilian Air Code has already established values for compensating damages and losses, it is not an impossible task to set ceilings for damages and losses regarding space activities. Furthermore, the current loophole leaves the Government staff vulnerable, so the law might establish criteria for compensating its employees or employees' families in case of loss of life, personal injury, or other impairment of health.

Definitely, it is preferable to establish measures to prevent disasters than it is to deal with the aftermath of a tragedy. In this context, the role of insurance companies is quite important, because they establish additional safety measures to be followed by private companies. However, when a state is carrying out space activities, insurance companies are not allowed to gather

information about the mission, because national security matters are involved. Notwithstanding, Brazil and all other states that undertake space activities have to keep improving their safety procedures and dedicate special attention to the subject. This is the best lesson from Alcantara and other space disasters.

## **APPENDIX**

### **The Law # 10.821**

This Law grants compensation to the families of the victims of the Alcantara's disaster to compensate their damages.

Art. 1 – A compensation which will be paid in one lump sum is granted to the families of the following Brazilian space program employees, who are the victims of the accident that occurred with the Brazilian Launch Vehicle, in the Alcantara Launching Center, on 22/Aug/2003:

- I – Amintas Rocha Brito;
- II – Antonio Sergio Cezarini;
- III – Carlos Alberto Pedrini;
- IV – César Augusto Costalonga Varejão;
- V – Daniel Faria Gonçalves;
- VI – Eliseu Reinaldo Moares Vieira;
- VII – Gil César Baptista Marques;
- VIII – Gines Ananias Garcia;
- IX – Jonas Barbosa Filho;
- X – José Aparecido Pinheiro;
- XI – José Eduardo de Almeida;
- XII – José Eduardo Pereira II;
- XIII – José Pedro Claro Peres da Silva;
- XIV – Luis Primon de Araújo;
- XV – Mario César de Freitas Levy;
- XVI – Massanobu Shimabukuro;
- XVII – Maurício Biella de Souza Valle;
- XVIII – Roberto Tadashi Seguchi;
- XIX – Rodolfo Donizetti de Oliveira;
- XX – Sidney Aparecido de Moraes;
- XXI – Walter Pereira Junior.

Single Paragraph – The amount of compensation will be proportionally reduced if the Brazilian Government is convicted by any administrative or judicial court.

Art. 2 – The compensation established in this Law will be granted to the families of the victims according to the rules set in the Law # 8.213, of 24/Jul/1991.

Art. 3 – The compensation will be paid in one payment and its amount will correspond to the current salary of the victim multiplied by the number of years remaining before the victim would have been 65 years old.

Paragraph 1 – For the effects of this Law, salary is considered:

- I – the value received monthly;
- II – individual bonus related to the period of work;
- III – bonus for the development of activity in science and technology;
- IV – individual payable benefit;
- V – individual bonus related to any incorporated value.

Paragraph 2 – The amount of compensation will not be less than R\$ 100,000.00 (one hundred thousand reais).

Art. 4 – The sons and daughters of the victims will receive monthly support for education until they are 24 years old.

Paragraph 1 – The amount of such support is R\$ 400.00 (four hundred reais) for each son or daughter and it will be updated every January according to the prices established by private educational institutions.

Paragraph 2 – The Brazilian Ministry of Defense will issue a directive to regulate this Article within 30 (thirty) days from the publication of this Law.<sup>18</sup>

Paragraph 3 – The Brazilian Ministry of Management will include the financial resources to cover the expenses of the above mentioned support in its annual budget.

Paragraph 4 – The values will be drawn monthly by sons or daughters, if they are over 18 years old, or by their legal representatives if they are not.

Art. 5 – *not related to the Alcantara disaster.*

Art. 6 – This Law will enter into effect on the date of its publication in the Official Gazette.<sup>19</sup>

Brasília, 18/Dec/2003.

Luiz Inácio Lula da Silva  
President of Brazil

José Viegas Filho  
Ministry of Defense

Guido Mantega  
Ministry of Management

## References

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<sup>1</sup> It is important to remember that Article I of the Liability Convention defines “damage” as being “*loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international organizations*”.

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Article XII further provides that the damages payable in compensation are to be determined “*in accordance with international law and the principles of justice and equity*”.

<sup>2</sup> The committee was established by the Directive DEPED # C-75/DG, of 28/Aug/2003, by the Brazilian Ministry of Defense.

<sup>3</sup> Russian experts had contributed to the project of the BLV. This is the reason why they were invited to join the investigative technical committee.

<sup>4</sup> There were two former unsuccessful launch campaigns of the BLV. However, on those occasions there were damages related just to the loss of the vehicle and its payload.

<sup>5</sup> The BLV had four solid fuel engines.

<sup>6</sup> In his paper “The Tragic Lessons from Alcantara” – The free translation from Portuguese was made by the author.

<sup>7</sup> The rights and obligations of the Government employees are regulated by the Brazilian Law # 8.112, of 11/Dec/1990.

<sup>8</sup> General and specific rules for the payment of pensions to the families of the Brazilian Government employees are established in the Law # 8.213, of 24/Jul/1991.

<sup>9</sup> Around US\$ 33,000.00 - at the average exchange rate of August/2004.

<sup>10</sup> Around US\$ 133.00 – at the average exchange rate of August/2004. This amount corresponds to the average tuition/month in Brazilian private schools, from pre-school through high-school.

<sup>11</sup> Consultant on national and international air law; Vice-President of the Brazilian Association of Air and Space Law – SBDA.

<sup>12</sup> Average exchange rate of August/2004.

<sup>13</sup> In his paper “China’s Space Policy”.



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<sup>14</sup> In his paper “The Convention on International Liability for Damage Caused by Space Objects and the Domestic Regulatory Responses to its Implications”.

<sup>15</sup> Article I of the Liability Convention refers to four areas of recoverable direct damage, namely, loss of life, personal injury, other impairment of health, and loss of or damage to property.

<sup>16</sup> The data regarding the work carried out by the investigative technical committee was obtained from the article “Synthesis of the Report about the Brazilian Launch Vehicle Accident” written by Petronio Noronha de Souza, from the Brazilian National Institute for Space Research – INPE.

<sup>17</sup> In his paper “Launching Alcantara into the Global Space Economy - The 2001 Brazilian National Space Law - The Continuing Story Of National Implementation of International Responsibility And Liability, Part II”.

<sup>18</sup> On 19/Jan/2004, the Ministry of Defense issued the Directive # 37/MD.

<sup>19</sup> The Law # 10.821 was published in the Official Gazette of 19/Dec/2003.