Space, Sovereignty, Inequality: Interpreting the Explosion of Brazil's VLS Rocket

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Resumen

Esse artigo explora narrativas produzidas a partir da explosão do foguete de lançamento de satélites (VLS) em 2003. A explosão causou a morte de 21 técnicos, mas, segundo alguns críticos, nunca foi devidamente explicada. Examino narrativas divergentes sobre a explosão que circulam entre grupos envolvidos, e analiso três representações de progresso e desenvolvimento nacional implícitos: o nacionalista, o neoliberal, e o redistributivo. A importância do lançamento de satélites para o programa espacial brasileiro, as terríveis consequências da explosão, a obscuridade em torno das causas do evento, e a incerteza que marcou a investigação, fizeram do evento uma potente metonímia para as idéias de diferentes grupos sobre o Estado-nação brasileiro, e suas futuros desejáveis e possíveis. Este trabalho também defende a importância da pesquisa etnográfica sobre a distribuição e os conflitos sobre a tecnociência, um ponto de inquérito importante para compreender a política da desigualdade global e de futuros imaginados. [Brasil, conflito, desenvolvimento, tecnociência, desigualdade]

Abstract

This article traces narratives stemming from the explosion of Brazil's VLS satellite launch rocket in 2003. The explosion killed 21 Brazilian technicians on the launch pad, but has never been explained to the satisfaction of many observers. I examine interpretations of the explosion, which circulate among different interested parties, and analyze three imaginaries of progress and national development implicit in these interpretations: the nationalist, the neoliberal, and the redistributive. The importance of the launch to Brazil's space program, the event's gruesome outcome, the opacity of its causes, and the uncertainty surrounding its investigation have made the event a potent metonym for different groups' ideas about the Brazilian nation state and its possible and desirable futures. This article also makes an argument for the importance of ethnographic research on the distribution of and conflicts over technoscience, a unique point of inquiry for understanding the politics of global inequality and of imagined futures. [Brazil, conflict, development, technoscience, inequality]

"Order and accidents seem equally impossible."

<div align="right">Kafka 1992[1909]:3</div>

ON THE MORNING of Friday, August 22, 2003 in Alcântara, there was a clear sky, a gentle wind, and none of the unseasonable rain of a few days earlier. On an equatorial peninsula prone to fierce dry-season gusts, the calm weather was welcome, both to villagers taking to choppy seas in rickety sailboats or planting the sangal (the dry-season manioc), and to the technicians of Brazil's space program running the final tests on the near 20-meter-high tubes of delicate electronics and heavy explosives that, in three days, if the calm weather held, would propel Brazil's ascent into space and into the ranks of spacefaring nations.[1]

Images taken that Friday by the base's security cameras[2] reveal an orange flare between the rocket's propulsors and the launching platform at 1:26:06 p.m. The ensuing explosion of the rocket then engulfed the camera, carbonized 21 engineers and technicians, set Brazil's space program back years or decades (Monserrat Filho 2003:38), blanketed surrounding villages with noxious clouds, and set loose a spiral of narratives and counternarratives about the meanings and causes of the explosion at Brazil's spaceport on the eastern fringes of the Amazon forest.

This article is not an inquiry into the explosion itself, which ended the third attempt to lift a Brazilian satellite into orbit aboard the Brazilian Satellite Launch Vehicle (VLS).[3] Neither I nor other interpreters of the event have definitive knowledge of its proximate causes. Rather, this article seeks to investigate how different interpretations of the event reveal the inequalities, conflicts, and imaginaries of the future and of the nation state, which undergird Brazil's faltering space program.

Recent scholarly and journalistic accounts have tended to emphasize Brazil's success in becoming a world power, stressing a convergence with the so-called First World, a reduction in international and internal inequalities, and the rise of a widely popular center-left politics (Cervo 2010; Cohen 2011; Kamrany and Jacobs 2012; Sotero 2010).[4] Discussions surrounding the explosion reveal much greater popular anxiety and conflict about Brazil's future than these familiar accounts.[5] The perspectives I analyze here identify setbacks for some ambitious possible futures, projects to remake the nation and to reconfigure historic inequalities on multiple scales. Technoscientific projects are teleological, "future-oriented endeavors [that] imply movement toward a goal and thereby involve assumptions or expectations about the future" (Bloomfield and Doolin 2011:63). Such assumptions about the future are particularly salient in projects oriented toward spaceflight, that most far-reaching and utopian of human technological endeavors. Moreover, as a conspicuous consumer of resources, space launching inevitably generates questions and conflicts about the allocation of resources and about social inequalities.

Until recently, most research that brought anthropological tools to science, technology, and society (STS) investigated the production of scientific knowledge and technological objects, rather than the "relationship between the meanings of scientific facts or technological artifacts and their sociopolitical milieu" (Edwards 1996:34). The STS work that did consider the sociopolitics of technoscience generally focused on world centers of technoscientific production. However, outside these zones of privilege, the significance of science and technology *already extant elsewhere* is a matter of deep concern. In an era of high-stakes

global conflict over access to patents (Coombe 1998), computer code (Coleman 2012), weapons materials (Hecht 2012), and restricted dual-use technologies (Gusterson 1999), the distribution of technoscience is fundamental to global inequality. Technoscience demands ethnographic attention to those sites where it is a subject of aspiration, conflict, and fantasy, not merely to its sites of primary production.

Over the last decade, scholars have increasingly considered questions of global power, difference, and inequality from the perspective of STS. A decade ago, in an influential article on "Postcolonial Technoscience," for example, Warwick Anderson called scholars to

> seek to understand the ways in which technoscience is implicated in the postcolonial provincializing of "universal" reason, the description of "alternative modernities", and the recognition of hybridities, borderlands and in-between conditions. (2002:643)

This is an important challenge to the naïve, metropole-focused universalism of much work in STS. But reconceptualizing inequalities once viewed through the *telos* of "development" or "modernization" with the homogenizing temporality of "alternative modernities" replaces a temporal conceptualization of inequality with a spatial one, but it leaves the relationships between technoscience and global inequality unanalyzed (Ferguson 2006:176–193; Kelly 2002). For many supporters of Brazil's space program, "development" and "modernity" are not discourses to provincialize as much as goals to achieve, and ethnographers should take such perspectives seriously. Successive Brazilian governments and agencies have tried to reverse engineer space technologies, which are fundamental components of contemporary technoscientific and military power but are monopolized by a few global powers. Despite the importance of provincializing power and valorizing the provincial, we should be careful not to mistake inequality for difference.

While the literature in "postcolonial technoscience" is important, a counterbalance to its flattening populism can be found in the scholarship associated with "Latin American Thought in Science, Technology, and Society" (PLACTS) and dependency theory (Cardoso and Faletto 1979; Dagnino et al. 1996; Evans 1979; Herrera 1971). These older bodies of theory from the global south critique the globally unequal distribution of technoscience, which they rightly understand to be an essential aspect of a global system of exclusion and exploitation.

The tensions between these different bodies of work should push us to give ethnographic attention to difference, and also to inequality; we need to look at the symmetries of STS,[6] but also at the asymmetrical rigors of technological catch-up; we should try to grasp "a world of multiple modern sciences," (Harding 2011:18) each requiring understanding in its own terms, as we also recognize that such technoscientific multiplicity enables political and economic inequality. These tensions also help bring this article's questions into clearer focus: what happens when a national technoscientific project, aimed at replicating extant technologies in order to challenge extant inequalities, fails? How do groups with different worldviews, experiences, and interests interpret the event and what do these interpretations reveal about culture and politics in sites where extant technologies are important objects of both aspiration and contestation?

Space technology has always been about earthbound contests as much as about any interplanetary goals. And in Brazil, involved in a game of catch-up as a would-be global

power, it has different political meanings than in the paradigmatic "superpowers" of the United States and once Soviet Union, involved, as they were, in a binary struggle to be first at various extraterrestrial conquests. For many proponents of Brazil's space program, launches are aimed as much at specific global inequalities as at any orbital trajectories, at a global order in which most are left earthbound, but some control space, with all the terrestrial advantages, material and symbolic, that brings.

After describing the development and circulation of the official report on the VLS explosion and the historical conflicts over Brazil's spaceport, this article analyzes three broad interpretations of the explosion encountered in my ethnographic research carried out around the base in 2004–6:[7] (1) interpretations of *nationalists*, particularly the Brazilian military, who see the event as a symptom of foreign sabotage and neoliberal treason undermining the project to make Brazil a world techno-military power; (2) interpretations of those associated with the civilian space program, who tend to attribute the explosion to military incompetence, and who advocate instead a space program that seeks profit, foreign partnership, and private capital; and (3) interpretations of locals, who mostly read the event in terms of their experiences of inequalities, in relation to their hopes for greater inclusion in an exclusionary society, and who have had some success mobilizing around an emerging ethnoracial political identity, *quilombola*. In conclusion, I suggest that these interpretations articulate three ideal-type contested visions of the nation state in contemporary Brazil: the *nationalist*, the *neoliberal*, and the *redistributive*.

Investigation and Circulation

The official federal investigation into the explosion was characterized by secrecy and was widely mistrusted; it also did not establish a definitive proximate cause for the explosion. Secrecy, as Masco writes in his article on the U.S. nuclear complex, "is wildly productive: it creates not only hierarchies of power and repression but also unpredictable social effects, including new kinds of desire, fantasy, paranoia, and, above all gossip" (Masco 2006:272; Simmel 1906:465). Like nuclear technologies, space technologies have military and non-military uses; their circulation is zealously limited by those who possess them; and their development and deployment have been characterized by secrecy and deception since their inception (Taubman 2003).

In the state of Maranhão, where the spaceport is located, the mass media are dominated by former Brazilian president, state governor, and then president of the Brazilian senate, José Sarney. Sarney has been the key political figure in Maranhão since 1966, when as a young writer and lawyer from the small city of Pinheiro (close to Alcântara) he allied with Brazil's military government (1964–85) and rose to the governorship. Since then, Sarney, his family, and his associates have constructed a wide network of clients who possess near total control of Maranhão's state-level mass media. Most get their news from the unfailingly pro-Sarney television station, the *Mirante*[8] (roughly, the Observatory), and the newspaper, *Estado do Maranhão*. A few less prominent competitors provide mirror-image anti-Sarney caricatures. Although the Internet has made it harder for corporations, governments, and political bosses to control information, Sarney's near monopoly of Maranhão's mass media remains strong.

In a book-length study of the explosion, a journalist from Sarney's *Mirante* television station (Nascimento 2005) contended that Sarney himself first alerted the press to the explosion. According to Nascimento, Sarney was at his beach house in the state's island capital, São Luís, when he noticed an expanding mushroom cloud across the bay, in Alcântara. Sarney is said to have demanded an immediate press investigation (Nascimento et al. 2004:99–100). But while the mushroom cloud quickly blew off the peninsula, the cloud of rumor about the event was just forming, and regardless of whether Maranhão's strongman really had the quickest eye in a city of one million, neither Sarney's reporters nor others would have access to much information in the first hours after the explosion.

Only top military staff had access to the telephones at the base after the blast and they claimed to be unaware of anything unusual (Nascimento 2005:102). When authorities finally gave an interview to the press hours later, they confirmed the VLS explosion and provided the number of missing persons. The general representing the Air Force ruled out sabotage, a quick denial now often adduced as evidence of a cover-up (Rezende 2003; Schlichting and Oliveira 2004:71). Although the official investigative commission was initially dominated by the military, pressure from the families of deceased technicians caused its expansion to include representatives of the military, academia, industry, families of the victims, and a group of Russian specialists (Nascimento et al. 2004:22).[9]

According to the conclusions of the expanded commission's report, later supported by a congressional inquiry (Brazilian Chamber of Deputies 2004), *either* an electric current or an electromagnetic discharge from within the rocket's machinery may have caused the propulsor's mysterious firing, the electromagnetic discharge being more likely. But the complete destruction of the rocket and all those present at the explosion (ghastly images of their burned bodies were later circulated) made it impossible to determine the origin of the charge. The report also listed the human, institutional, mechanical, and environmental factors that might have contributed, notably, inadequate financial resources and poor coordination among the space program's groups (Nascimento et al. 2004; see also Brazilian Chamber of Deputies 2004; Johnson and Almeida 2008).

It was also widely reported that the federal police investigated the presence of foreigners, but the results of this investigation into possible foreign sabotage remain secret. There exist, then, at least two official investigative reports into the 2003 explosion: a public one, by the official investigative commission, dismissing foreign sabotage, and a federal police report into the presence of possible foreign saboteurs, the results of which remain secret.

Suspicion of the public investigation's conclusions is a constant feature of discussions of the explosion in the state of Maranhão, although Sarney's media have generally reported the investigation's conclusions as definitive. Early in my fieldwork, just after the release of the report, for example, the Brazilian Society for Scientific Progress held its regional meeting in São Luís. At a talk about the report by a space program engineer, local university students expressed near universal suspicion. But to each question about possible sabotage (including, among many, an explosive charge shot from ships in the bay or by foreigners "vacationing" in Alcântara, or a malicious program in the U.S.-engineered onboard computer system) the engineer explained, "We investigated this a lot. But there hasn't been any indication of this type of action." The audience boisterously expressed its doubt.

I have no idea what caused the VLS to explode; nor do most people who opine about it. The official report's conclusions are plausible to me, but neither I, nor its critics, has the means to definitively evaluate them.

However, the lack of transparency of an investigation advertised as transparent (Zaverucha 2005:232), the differential access to information of the various interested publics, the indeterminacy of the official report's conclusions, and the unintelligibility of launching technology to those without extensive technical education, created a perfect climate for the circulation of counternarratives and made the explosion an exceptionally flexible signifier. Space launching is, moreover, perhaps the most vivid way modern nation states project their power, both literally and figuratively. As Cold War space programs were metonymic of United States and Soviet progress and power, the fraught trajectory of Brazil's space program became, for interpreters of the explosion, a metonym for the trajectory of the nation state.

Alcântara: Its Space Programs and Its Social Movements

The unsatisfying nature of official discourse has lent a wariness and urgency to the tone of unofficial interpretations of the explosion. But the content of those interpretations has been shaped by the worldviews and political desires of interpreting publics, mostly far removed from the material causes and consequences of the event. In this section, I briefly sketch the tensions that have structured interpretations of the explosion, between the military and civilian wings of Brazil's space program, on the one hand, and between locals and the spaceport, on the other.

In 1961, at the height of the space race between the United States and the Soviet Union, and a year after the completion of Brazil's modernist capital, itself part of an idealized vision for the transformation and modernization of the nation (Holston 1989), Brazil established by presidential decree the first Latin American space program. It was at first limited to research and personnel training, but in the mid-1970s, Brazil's military regime, flush with cash at the height of its "economic miracle," created much of the infrastructure for space development (Ceballos 1995:202). During this period, the Ministry of the Air Force[10] took responsibility for developing the Alcântara spaceport and the VLS rocket. Alcântara was chosen because it lies only 2.18° from the equator (which gives launches of geostationary satellites a boost in fuel efficiency); it also has a peninsular location (which facilitates a variety of launch trajectories), a nearby deep-water port, low population density, and stable weather patterns; and unofficially, according to sources within the Brazilian Space Agency, it was chosen because of Jose Sarney's alliance to the military regime.

The space program's trajectory runs parallel to that of the broader Brazilian military-industrial complex, which boomed during the 1980s, when Brazil became the world's fifth largest exporter of arms (Conca 1997:2), and declined after the end of the Cold War. At its early height in 1988, the Brazilian space program received some US$130 million in federal funding,[11] but in 2002, the year before the VLS explosion, its total funding had fallen to some US$15 million (Silveira 2003; see also Amaral 2009; Brazilian Chamber of Deputies 2004). After the explosion, space funding rose briefly to 1980s levels, but, despite the booming economy of the 2000s, funding again slowly declined (Amaral 2009:20).[12]

Currently, funding is again on the rise; the present government of Dilma Rousseff has allocated approximately US$250 million to the space program for each year from 2012 to 2015 (Agência Estado 2012; Melo 2013) but this remains much less than amounts spent by major space programs.[13]

For nationalist advocates of the space program, the reduction in funding, like the "accident" at Alcântara, is no accident. The agent most often proposed is, unsurprisingly, the United States. U.S. policy has been crucial to the diminishing and reshaping of Brazil's military-industrial complex and, in particular, its space program. The United States has opposed the VLS program since its inception, as diplomatic cables released by WikiLeaks have recently confirmed (Passos 2011); most likely, the United States wished to prevent the emergence of another military launching power in the western hemisphere, and to defend U.S. commercial interests in satellite launching.[14]

For nearly a decade, the Brazilian government rejected the Military Technology Control Regime (MTCR), a 1987 agreement created by the G7 countries to limit the spread of missile technology beyond the existing monopoly. In retaliation, the United States successfully pushed in 1987 for a boycott of the export of dual-use technology to Brazil, limiting Brazilian access to the technology necessary for development of the VLS (Bowen 1996:87; Conca 1997:154–155).

Faced with this technological lockout and strengthened by the ascendancy of civilian over military authority in the Brazil of the 1990s, the administrations of Itamar Franco and Fernando Henrique Cardoso broke with the military, creating the civilian Brazilian Space Agency (AEB) in 1994, under Franco, and signing the MCTR in 1995, under Cardoso (Escada 2005:112–113). This new agency did not replace the military program, and left Brazil with what amounts to two space programs: one under civilian and one under military control.

Before this split, the Air Force, then in control of the entire space program, built the spaceport in Alcântara, in one of Brazil's poorest regions. In 1980, the governor of Maranhão ceded 52,000 hectares on Alcântara's coast to the federal government for the construction of a new satellite base.[15] Some 15 hundred residents of coastal villages were relocated in 1986/87 from approximately eight thousand hectares and resettled in seven government-built *agrovilas* (agricultural villages). This expropriation and resettlement resulted in enormous changes in villager lives and livelihoods, transforming people who had once lived principally from fishing, gathering, and horticulture on communally held land into wage laborers, dependent principally on irregular work on the base, and on the diminishing returns from small, individual plots of land that were soon overfarmed. These changes generated widespread distrust of the base and the federal government,[16] especially among the two thousand or so villagers whose land had already been slated for expropriation when the VLS exploded. Although the Brazilian government has planned to expand the operating area of the base to between 12,000 and 20,000 hectares of coastal land since the early 1980s, the resistance of villagers and their broad base of allies has so far blocked these plans (Almeida 2006a, 2006b; Andrade and Souza Filho 2006; Mitchell 2008; Pereira Junior 2009; Silberling 2003).

During the 1980s and 1990s, villagers were primarily represented by a Rural Worker's Union, and the class marker, "rural worker" was their principal category of political identity and resistance. However, a 1999 seminar in Alcântara brought the nascent *quilombo*

movement to Alcântara. Today this movement is the principal institutional representative of locals and *quilombola* is the key category of political identity and resistance. Historically, a *quilombo* was a community of escaped slaves; *quilombo*-descended communities (*remanescentes das comunidades dos quilombos*)[17] won the right to inalienable land title through the "*quilombo* clause" in Brazil's 1988 constitution. Since the mid-1990s, a national movement has mobilized communities around these rights throughout Brazil, helping create politically powerful ethnoracial solidarities where they had previously been weak or nonexistent (Arruti 2006; French 2009; Mitchell 2008; Silberling 2003). Ethnicity has superseded class as the prevalent idiom of local political struggle, in a trend consistent with broader developments worldwide (Comaroff and Comaroff 2009). Furthermore, although villagers whose land is still marked for expropriation remain on their land for the time being, they have not yet been awarded land title and local fears of expropriation remain strong.

The Counterinvestigation: Order and Accidents, Order and Progress[18]

As stated, I am agnostic about the causes of the explosion and do not reject entirely the possibility of sabotage that is central to nationalist interpretations: I simply do not know. But whatever the truth of nationalist interpretations, they are marked by an aggrieved and paranoid style (Hofstadter 1965), are deeply suspicious of asserted scientific impartiality, and are certain that powerful, deliberate actors lurk behind important events. This suspicious tone of much discourse around science, technology, and sovereignty in the Brazilian military has been noted by many scholars, particularly concerning military suspicions of foreign designs on the Amazon (Celso 2006; Lahsen 2009; Martins Filho and Zirker 2000; Rajão and Hayes 2009; Vainer 1990).

However, less has been written about military nationalist discourses surrounding techno-military development. In this section, I focus on a widely circulated counterinvestigation into the explosion's causes. I argue that nationalist discourses about the explosion reflect anger and anxiety about a perceived abandonment of Brazil's project to become a techno-military power. For nationalists in the military, the explosion is a symptom of a treacherous abandonment of the goals of national industry, progress, and power, undermined by foreign forces, their subaltern dupes, and their civilian technocratic coconspirators.

Following the release of the official investigative report, a group of nationalists quickly released an 84-page counterinvestigation (Schlichting and Oliveira 2004), coauthored by a Brazilian businessman and a retired army colonel. A group of retired army officers also participated, but no information is available about them. Not only are the names of the majority of the group members undisclosed, the 2004 document states that they were also preparing a secret version of this report, apparently including damning classified information.

The publicly available counterinvestigation focuses on three points. First, the authors argue that official accounts of the causes of the explosion are implausible. Rejecting the possibility of an untimely firing in the propulsor, they write,

Any hypothesis of a 'natural cause' must be rejected by these extremely experienced technicians who have worked in the three investigations[19]—especially this last one—because these investigators, with their experience of many successful launches,[20] must be aware that THERE HAD NEVER BEEN an untimely firing until now. (Schlichting and Oliveira 2004:7)

Second, they state that the failures of the 1997, 1999, and 2003 launches were all the result of sabotage by the United States, aided by complicit Brazilians. The third claim is that a U.S.-led conspiracy to undermine Brazil's sovereignty and techno-military development lies behind not only the sabotage of the VLS but also the reduction in funding of the space program, the increased control of the space program by the civilian AEB (rather than by the Air Force), and the attempt to turn the spaceport into a commercial venture. Brazil has been cheated of its future by an externally imposed military-industrial dependency.

This article's epigraph was written by a young Franz Kafka in his evocative account of a 1909 airshow. Kafka helps set a mood of suspicion and bureaucratic secrecy, but the epigraph is also meant to be evocative in other ways: a founding indignity for the nationalists of a *Brasil Grande* is precisely that the North American Wright Brothers are frequently credited with the first heavier-than-air flight, only five years before Kafka's airshow, when the Brazilian Santos Dumont also has a plausible claim to the achievement (Menezes 2010).

"Order and accidents seem equally impossible," Kafka laments. But for the official government investigative report, which emphasizes complexity, the multiplicity of contributing factors makes accident seem not impossible, but *inevitable* in so complex a system, a basic principle of the "normal accident theory" (Perrow 1999) used for accident prevention and investigation worldwide (Johnson and Almeida 2008). For the counterinvestigation, however, mere accident does seem *impossible*: the explosion fits a familiar pattern, in which national ambitions are stifled by world powers guarding their position. Order and accidents: no mere accident here, but an ordered repetition of a familiar pattern.

I do not know whether the counterinvestigation group's secret document was in fact prepared, or to whom it might have been shown. But the claim of this group parallels the government's production of both a public report and a secret police investigation into foreign sabotage. Of course, it is possible that the secret counterinvestigation report was kept so in order to protect classified information, but I find it at least as likely that the assertion was made to project the authors' exclusiveness and authority, to project their status as people who possess national secrets of such importance that they would not want to divulge them (Gluckman 1963:309; Masco 2006:272).

And this hints at the crux of the matter for the nationalists of the counterinvestigation. Despite the public suspicion in Brazil around the real causes of the event, the principal political concern underlying the counterinvestigation, national investment in autonomous technomilitary development, has received limited public support, even during Brazil's booming 2000s (Anderson 2011; see also Oliveira 2006; Rocha 2007). The counterreport is shot through with a tone of aggrieved marginalization, with capital letters often used for emphasis and explicit nostalgia for Brazil's 1964–85 military regime (2004: 19). It reads like a plea to return to the kind of state-led national development that was fundamental to Brazil's politics from the 1930s to the 1980s, fueling aspirations of world-making greatness, but also legitimating brutal inequality (Martins 2000).

The frustration of military nationalists in the face of neoliberal space development may become even more profound. Global enthusiasm over such private space corporations as SpaceX (Valentine 2012), and of technologies such as space tethers or elevators (Avnet 2006), may further marginalize this military nationalist vision, and raises the specter of possible obsolescence for a nationally driven space program relying on the geographical advantages of Brazil's equatorial base.

I should also note that despite their occasional success at unmasking the often hidden face of U.S. influence in Brazilian policy, nationalist narratives about the spaceport and explosion generally position themselves against the *quilombo* movement. One Air Force officer told me that officers would not grant me interviews because I was associated with the *quilombo* movement, which officers saw as U.S.-influenced and antinational.[21] "All these people from the countryside and all these NGOs talking about *quilombos* are just doing Uncle Sam's work," he said. This nationalism is hostile to local concerns, despite its concern for the progress and sovereignty of the abstract nation (see Mitchell 2010).[22]

The Civilian Program: National Utopia in an Antiutopian Idiom

One 2005 interview with an engineer from the civilian National Institute for Space Research (INPE) turned heated when I inquired about the land conflicts around the spaceport. Aware, perhaps, of my close association with the *quilombo* movement in Alcântara, the engineer said testily, "You think we should just live in huts and grow bananas around here? We want to build a modern space program that can compete internationally and bring real benefits." He had spent the previous 30 minutes talking about the lucrative market niche for Brazilian launch services from Alcântara, about the importance of allowing foreign capital and corporations into the space program, and about the futility of allowing the government and military to direct the building of rockets in the 21st century. So the abrupt switch to an idiom of developmentalist nationalism came as a surprise, although his disdain for local lifeways did not.

But I should not have been surprised. Like partisans of the military program, civilian space program partisans often articulate a vision of national progress, concerned about Brazil's fraught space–industrial ambitions and optimistic about a future of Brazilian spaceflight. Yet they share very different assumptions about what this progress means and how it might be achieved. For military nationalists, techno-military development is a condition of possibility for the goal of national sovereignty and advance; for partisans of the civilian space program, an opening to foreign capital and technology is a condition of possibility for the creation of a profitable and competitive enterprise. For military nationalists, the government must be diligent against possible foreign threats to sovereignty; for partisans of the civilian space program, the Brazilian government needs to be realistic about its limited capacities and attentive to a lucrative market niche.

Unlike military nationalists, partisans of the civilian program frequently claim that the military does not have the competencies or structure to do its job. Many civilian space program workers are concerned about the program's complicated governing structure and resentful of the military's continued autonomy, despite the military program's official

subordination to the civilian Space Agency. They usually attribute the VLS failure to this military autonomy.

A technician for INPE, who had worked for nearly two years with the Air Force at the spaceport, put it this way to me in 2005:

> we built satellites and launched satellites with China, with the United States.[23] We have all the expertise for the satellites. But the VLS is a military project and it is they who continue to mess up and who caused that accident. There is an opportunity with Ukraine[24] to improve our launching technology and for Brazil to enter the market for launching satellites but [the Air Force] doesn't even want the Ukrainians on the base.

Costa Filho, the author of a significant political history of Brazil's space program (2002), expresses the civilian position sharply, providing, in a published interview, a neoliberal and technocratic answer to the puzzle of the unexplained explosion:

> Yes there is a lack of resources, but there are other problems. The problem is one of administration: [the space program is] coordinated by the civilian Brazilian Space Agency [AEB], but even that's not autonomous; it is subordinated to the Ministry of Science and Technology. So it doesn't have direct control over the principal scientific organs INPE, which is also subordinated to the Ministry of Science and Technology, and the IAE (Air and Space Institute), which belongs to the Air Force and is subordinated to the Ministry of Defense. Look, the role of [the civilian Space Agency] is to coordinate the space program . . . [it] signs the treaties [for international space cooperation], but those who carry out the work are the other organs . . . This confused structure creates many problems. In the case of . . . the program commanded by the military, for example, every two years a new commander is nominated for the sector and the knowledge accumulated during that period is lost . . . The AEB should respond to the President of the Republic . . . and [the other agencies] should be subordinate to [it]. We need a program that is administered in a business fashion, not a military fashion . . . Even in China, which is one of the most closed regimes in the world, when they want to do a launch they go to the China Great Wall Corporation. Here, instead, we try to make rockets in a barracks environment (interview in Nogueira 2004).[25]

In contrast to the explicit developmentalist nationalism of the counterinvestigation, which casts the explosion as a symptom of diminished sovereignty, here it is attributed to outmoded military control in an era when complex enterprises are best run like businesses. Partisans of the civilian program rarely articulate an explicitly teleological vision, as do the military nationalists, with their conception of the sovereign and powerful nation that they wish to realize. Partisans of the civilian program more often speak in terms of constraint and necessity: in terms of the possible and impossible, rather than the desirable. But implicitly, their accounts rely on a neoliberal conception of development.

In the decades since the fall of the Soviet Union, much social theory and social science focused on global inequality has singled out neoliberalism as a singular world-historical force. Neoliberalism, in its posture of acquiescence to economic law, is frequently presented as antiutopian, bleakly slogging to create "a world in which no one believes any other economic system could work" (Graeber 2012). But one could also say that it imagines a

conservative utopia, as Bourdieu suggested in 1998, at the moment when (implausible as it was) many believed that neoliberalism had truly brought an end to such ideology:

> [Neoliberalism] is a new type of conservative revolution that claims connection with progress, reason and science—economics actually—to justify its own re-establishment, and by the same token tries to relegate progressive thought and action to archaic status [Bourdieu 1998:125].

This neoliberal "new type of conservative revolution" has tried to relegate not only progressive thought, but also the conservativism of the military nationalists, to archaic status. There is a utopia to this neoliberalism: a utopia of profit-driven, economistic, and supposedly apolitical progress; a utopia content with inequality, as long as it promises progress and profit; and a utopia, like that of the nationalists, that gives only passing consideration to the economically excluded, even those right outside the spaceport's perimeter.

The Local Explosion

When the VLS exploded, I was in Chicago preparing to leave for long-term fieldwork in Alcântara at the start of 2004. As a U.S.-born anthropologist aware of accusations of U.S. sabotage, I followed the news with apprehension. On arriving in Alcântara, however, I discovered that such suspicions had receded into the background locally. For those surrounding the spaceport, national relations of race and inequality and local issues of land and livelihood were of much greater concern than the national and international politics of the space program. For locals, the explosion raised issues of space in a terrestrial sense.

I began to understand these dynamics during the September–October 2004 lead-up to the first suborbital launch after the explosion of the VLS.[26] Before I was aware of the pending launch, I noticed a new group of civilian and military workers for the space program, making the few town bars lively in the evenings. Almost exclusively middle-class men, and mostly white, these soldiers and technicians who fill Alcântara during the lead-up to a launch are principally from the large cities of Brazil's southeast.[27]

As the town filled with men who had much more disposable income than locals, some securing liaisons with local young women, many of my friends in Alcântara during that early fieldwork, young men like myself, made their resentment clear to me. With an attitude of justice having been done, some attributed the explosion to the technicians' late-night drinking and to their hangovers. Although this perspective seemed exclusive to young heterosexual men, it was a variant of the more widely held attitude that the explosion resulted from the space program's moral failings: by harming locals it was suffering a morally appropriate fate. It would take me far beyond the scope of this article, but it is worth noting that this assertion by local men hinges on their sense of marginalization in the unequal Brazilian sexual–racial economy, which is foundational to the myth of Brazilian "racial democracy" (Goldstein 1999; Moutinho 2004; Twine 1996).

Sometimes articulated in this idiom of sexual resentment shot through with class and gender, sometimes more explicitly in terms of racial difference, and sometimes with more supernatural overtones, this assertion of recompense for moral failures in a context of

deeply unequal and unjust relations was the most common theme in interpretations of the explosion in Alcântara's urban core, as well as in the surrounding rural villages.

In Mamuna, the village closest to the launch base, first scheduled for expropriation in 1986, some villagers suggested that the fierce eruption of sound and smoke on that day was a ruse to scare them from the homes they had resisted leaving, part of what they have generally perceived as a history of underhand deceptions by those running the space program. Many interpreted the explosion as spiritual retribution for the base's incautious invasion of enchanted spaces and for its expropriation of a seaside cemetery. "They'll never launch anything there the way they treated the enchanted ruins,"[28] one villager predicted. Villagers active in the *quilombo* movement often elaborated this theme of supernatural retribution by noting that the *Festa de São Benedíto* had taken place just prior to the explosion. This annual three-day celebration of Saint Benedíto, revered throughout the peninsula as the saint of enslaved Africans and their descendants, explicitly valorizes Alcântara's African traditions.

Villager political sentiments are not inherently more local than those of the bureaucrats of Brazil's space program. São Paulo is as local a place as Alcântara. But in Alcântara, threats to land and social reproduction are materially present, while claims about the national importance of the space program are abstract and less meaningful. For constituencies beyond Alcântara, however, the base has a less direct impact on their lives, and forms part of a broad national, and extraterrestrial, spatial imaginary. Moreover, residents in Alcântara are distrustful of claims made by representatives of the space program; since 1980, they have been promised a never-fulfilled utopia of local development tied to extraterrestrial conquest.

Allied to a wide network of NGOs, lawyers, and anthropologists in Brazil and abroad, Alcântara's residents have formed locally powerful social movements that have prevented expansion of the spaceport, although residents still have not received constitutionally mandated *quilombola* land title. But despite the success of Alcântara's social movements, and a wide variance in the views of locals (Mitchell 2008), their demands are generally for modest rights of citizenship that other participants in debates about the spaceport already enjoy. One social movement leader, an intellectual woman from a village that was expropriated by the Air Force in 1986, brought together many of these themes in a 2005 interview, providing a moral reading of the explosion and her desire for a very modest citizenship and a *redistributive* state:

> I don't understand what they do on that base or why they keep failing. But I'm not surprised that things haven't gone right for them with all the misery they've created here in Alcântara. What we are demanding is to keep our land . . . we want electric light, decent roads, schools so we can have some future for our children . . . respect for the rights we are supposed to have as citizens.

Conclusion: Competing Futures, Ordered Accidents

Valentine's work on NewSpace industries has shown that contemporary profit-oriented space projects are often motivated not simply by profit, but by a utopian ambition of a human future in the stars (2012). In response, perhaps, to the post–Cold War abandonment of such extraterrestrial utopianism by governments (Graeber 2012), private corporations,

principally in the United States, have adopted a habit of dreaming and speaking on behalf of the entire human future, a kind of utopian, and imperial (Redfield 2002:796), grandeur that could make Neil Armstrong's "small step for a [white American] man" symbolic of a "giant leap for mankind."

It is notable, by contrast, how infrequently the participants in Brazil's discussions of the VLS and the Brazilian space program speak on behalf of all humankind. The debate in Brazil is local and national, and very much about the character of the state and national development in an era of possible catch-up. Publicly fantasizing about the "future of mankind" seems to be the privilege of imperial powers and their privatized descendants.[29]

The nationalist and the neoliberal accounts of the explosion provide two different visions of the nation state and two different conservative futures. The nationalist vision imagines a return to authoritarian state-led progress, a future of sovereignty and national advance supposedly undermined by *quilombola* subalterns, antinational neoliberals, and pervasive foreign interests. The neoliberal vision, although couched in an idiom of technical necessity, imagines a future of profit-driven progress, a future that gives the "appearance of a message of freedom and liberation to a conservative ideology which thinks itself opposed to all ideology" (Bourdieu 1998:126). This neoliberal utopia of antiutopianism sees itself as undermined by an outdated military space program, by subalterns who insist on an interventive role for the state, and by the nationalists and populists of the left and right who block the path of technocratic and neoliberal progress.

Local interpretations of the explosion provide a third vision. Expressed in an idiom of grievance, like the nationalist and neoliberal accounts, villagers articulate the desire to find state-supported redress from the indignities and inequalities imposed both by the spaceport and by their long history of slavery, exclusion, and exploitation. Holston has influentially identified an "insurgent" style of citizenship in contemporary Brazil (2007). Villager demands seem, perhaps, mild to be called "insurgent." But demands for state protection and modest redistribution have achieved some tenuous success. It would have seemed absurd to observers of the spaceport's construction in the 1980s that Alcântara's descendants of slaves, escaped slaves, and Tupinambá, long politically marginalized, and from one of Brazil's poorest regions, might mount a viable defense of their land in terms of a recently forged ethnoracial claim on the state. Yet, despite its many uncertainties, this is what has happened so far.

I have argued in this article that interpretations of the VLS explosion have been shaped by conflicting national imaginaries in contemporary Brazil. I have also argued that because its opacity makes it so flexible a signifier, because of its orientation to the future, because of its importance to political and economic power, because it is so unequally distributed, and because it requires enormous expenditure and distributes enormous risks, technoscience is an ideal ethnographic site for examining conflicts, anxieties, and imaginaries about governance and inequality. And I have argued that all this shows contemporary Brazil to be riven by conflicts and perduring inequalities, which have been obscured by its recent political and economic successes. How these conflicts, anxieties, and imaginaries focused on Brazil's fraught space program might have an impact on the future for Alcântara's residents, Brazil's space program, global techno-military hierarchies, and perhaps even some extraterrestrial human destiny, remains to be seen.

Acknowledgements

Notes

[1] A surprise dry-season rain did wet some of the electrical parts of the rocket; however, after the equipment was dried it was found to be undamaged (Nascimento et al. 2004:25).

[2] The images were released in the Ministry of Defense's 2004 investigative report (Nascimento et al. 2004:30–31)

[3] For an exemplary study into the social and technical causes of another spaceflight disaster, see Vaughan 1996.

[4] The widespread protest movement beginning in 2013 has also ruptured this once dominant narrative.

[5] See Collins 2004 for an excellent ethnographic analysis of such conflicts over future-oriented projects in Brazil.

[6] In its earlier versions, the idea of "symmetry" in STS emphasized use of the same analytic tools to explain true and false beliefs (Bloor 1991 [1976]; Hess 2001); later formulations emphasized use of the same analytic tools to analyze human agents and nonhuman objects (Latour 1988). In an important essay in the development of "postcolonial technoscience," Redfield (2002) joins this emphasis on symmetry to Chakrabarty's (2000) push for the provincialization of Europe's ostensible universals.

[7] I began this project in 2001 and conducted intensive full-time ethnographic research in Brazil from January 2004 to August 2006. During that time I conducted interviews and had informal conversations with hundreds of villagers, activists, soldiers, scientists, and workers on the base. I attended meetings between officials of the base and villagers, as well as other public hearings. I also conducted interviews with officials involved with the politics of the spaceport in Brasília. I have continued research on this project since then, returning to Alcântara, and maintaining regular contact with participants in Alcântara's conflicts.

[8] The *Mirante* provides local news and programming for Brazil's dominant *Globo* network.

[9] On the day of the explosion, the president of the Brazilian Space Agency was in Moscow in negotiations with the Russian government for the possible use of the base. Over time, there have been negotiations between Brazil's space program and those of Russia, the Ukraine, the United States, China, and Israel, all of whom are interested in the gravitational advantages offered by Alcântara's equatorial location, and all possessing more successful launching programs than Brazil. According to sources at the Space Agency, Russian technicians were immediately invited to participate in the Brazilian investigation.

[10] The Armed Force ministries were reduced to the status of "Commands" subordinate to a civilian Ministry of Defense during the Fernando Henrique Cardoso administration in 1999.

[11] The annual budget of the U.S. space program, by far the world's largest, ranges from about US\$15–\$20 billion per year.

[12] Even during Brazil's economic boom of the 2000s, industrial production has played a shrinking part in the Brazilian economy. From 2002 to 2009 manufactured goods dropped from 55 to 44 percent of Brazil's exports, while raw materials went from 28 to 41 percent of Brazil's exports (Anderson 2011; see also Oliveira 2006; Rocha 2007).

[13] The cost of a VLS rocket is approximately US\$6.5 million (Gouveia 2003:33).

[14] Satellite launching is dominated by a few countries and companies. From 2007 to 2011, 38 percent of commercial and noncommercial launches were Russian, 24 percent were launched by the United States, 16 percent by China, 9 percent by Europe (with most of the European launches taking place at Kourou, a base in French Guiana). Japan, India, Israel, North Korea, South Korea, and Iran also launched some satellites during this period and until the

present. Some launches were also carried out from the Sea Launch equatorial launching platform, formerly controlled by a multinational consortium of companies and today controlled by the Russian corporation, Energia Overseas Limited. The total revenues generated by commercial launches nearly doubled from 2006 to 2010, going from $1.4 billion to approximately $2.5 billion (Federal Aviation Administration 2012:17–18).

[15] A 1991 federal decree expanded this area to 62,000 hectares.

[16] Distrust was also generated by a long series of broken promises, which are detailed in Mitchell 2008, particularly in chapter 3.

[17] How to identify such communities is contested. Although a 2003 presidential decree established "auto-identification" as the legal criterion, this decree is currently facing legislative and judicial challenges.

[18] The next two sections of this article, on interpretations of the explosion within the Brazilian military and civilian sectors of the space program, are ethnographically thinner than the rest of my article. Widely circulated suspicion about me severely limited my ethnographic access to the space program itself. I was prohibited from interviews by the director of the spaceport during the years I lived in Alcântara, so much of my data come from textual sources, informal conversations, and off-the-record (and off-the-spaceport) interviews.

[19] They are referring to investigations into the 1997, 1999, and 2003 VLS failures.

[20] There have been more than 300 successful suborbital launches from Brazil.

[21] Debates over race and ethnicity in Brazil have for the last few decades been haunted by the accusation of U.S. influence in fomenting reified and binary racial categories, accusations made both by the political left and right. (For a few touchstones for this debate in English, see Bourdieu and Wacquant 1999, Fry 2000, and Hanchard 2003.)

[22] This right-wing military nationalism, as Lourenção observes, does have some commonalities with forms of antiimperial nationalism more often associated with the left (2007:169).

[23] The China–Brazil Earth Resources Satellite is a successful binational satellite program, and Brazilian-built satellites have been launched successfully from the United States.

[24] Alcântara Cyclone Space is a joint Brazilian–Ukrainian company created in 2003 to take advantage of Alcântara's gravitational advantages and Ukraine's launching technology on international satellite launch markets. As this paper goes to press in November 2013, the company is building launch facilities within the existing base.

[25] See also, Costa Filho 2002, Escada 2005:107–113, Furtado 2003:26, and Nogueira 2003.

[26] Even though the Brazilian space program has yet to place a satellite into orbit, it has had many successful suborbital launches. This one was the prototype of the VSB-30 suborbital sounding rocket, constructed in partnership with the German Space Agency.

[27] Some soldiers are usually stationed at Brazil's Barreira do Inferno launch base in Natal. The base was built in 1965, four years after the inception of the space program, but the city of Natal encroached and made expansion impossible. Many of the civilian engineers and technicians, on the other hand, live and work in the city of São José dos Campos in the state of São Paulo, the hub of Brazil's aerospace and military industries.

[28] Alcântara's land and seascapes are populated with a wide variety of spirits and enchanted spaces, known locally as *encantados* and *lugares de encantaria*. These places, often associated with the ruins of Alcântara's slave infrastructure, are generally avoided as spiritually dangerous places.

[29] It is possible that shift could happen if the Brazilian space program moves from failure to success. Redfield's anthropological study of the European Space Agency's base in French Guiana (2000) traces such shifts, as that program went from failure to success.

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