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Interoperability models in Brazil

IBTTA GENERAL SESSION
- INTEROPERABILITY -

Plano, TX. May 15th, 2011

Intelligent Transportation Systems in Brazil

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- National System for Automated Vehicle Identification (**SINIAV**)
  - Based on ISO18000-6C
  - Added Custom Commands for Security
- National System for Product and Cargo Identification, Tracking and Authentication (**Brasil-ID**)
  - Based on SINIAV; same infrastructure
- Integrated Vehicles' Automated Tracking and Registration System (**SINRAV**)
  - GPS/GPRS/Satellite Vehicle Tracking

SINIAV systems

- Local (State) Back-Office
  - Based on the same systems that emits regular License Plates
  - Link w/ State Police and National Dept of Transportation (Denatran)
- National/Federal Back-Office
  - At Denatran; Integrates and exchange data between States
- License-Plate Issuing/Initialization Offices
  - Operates on the same site regular license plates are issued
- Multi-Lane Free-Flow RFID Portals
  - Both for Highways and Cities

Brasil-ID systems

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- Local (State) Back-Office
  - Secretary of Treasure of Each State
  - Based on existing Electronic Invoice System
- Integrated (National) Back-Office
  - System in cooperation w/ IRS
  - Operation: Centralized in Sao Paulo
- Transponder Initialization Mechanisms
  - At the product/pallet manufacturing/closure (as w/ cigarettes in Brazil today)
- Government's Fiscal Check-Points
  - Approx. 1,000 check-points in Brazil today
- Figure of "Operators" being defined in detail

SINRAV systems

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- Systems' Operators Back-Office
  - Private Tracking Services defined a common protocol to address a single GPRS chip
- Integrated (National) Back-Office
  - Located at the Department of Transportation
  - Roaming and Activation is controlled by Denatran
- Tracking-devices installation by the Car-Makers
  - Tracking device is mandatory for new vehicles
  - Service activation upon acceptance of the Car owner
  - Besides Tracking, a remote engine shut-off control

About SINIAV

- SINIAV is organized by the Ministry of the Cities (MC) and the National Traffic Committee (CONTRAN) in Brazil, based on Resolutions Nr. 212 issued on November 13, 2006, and Resolution Nr. 338 issued on December 17, 2010, by CONTRAN [RES:212:2006, RES:338:2009], referring to LAW 121 of 2006.
- SINIAV foresees mandatory electronic registration for all vehicles in the country, including passenger cars, trucks, motorbikes and etc. The official deployment phase of SINIAV starts on June 30, 2011, to be completed by June 30, 2014.

SINIAV BackOffice

- **A Centralized Back Office system module**, operated by the National Department of Transit – DENATRAN:
  - To provide essential, integrated and processed information on Vehicles available to Public Transportation and Security Agencies across the country
  - To keep and manage configuration and cryptographic keys related to security and management of the national system;
  - The management of an exception list, keeping the records of violations and any other non-conformation events detected by all SINIAV operating units. This exception list refers to vehicles that are irregular in terms of legal and/or fiscal obligations
- **A Local (Back-Office) system** operated by State authorities including:
  - License-Plate emission
  - Connection to Police and other Public and Private Services

SINIAV Data-Flow

- Through the Operator's Console, Detran's officer requests an electronic plate configuration; in this operation, he/she needs to manually input vehicle data (RENAVAM – Vehicle National Registration Number, Plate, Model, Type) using a console.
- Siniav Core (Denatran's Back Office) checks all the data of the vehicle in RENAVAM-backoffice, the national database of vehicles in Brazil.
- Siniav Core generates a 'key' to this transponder and includes this electronic plate in one of the national “Group Keys". This association between electronic plate and security-key is stored in Denatran's Back Office Database.
- Siniav Core connects to the License-Plate Emission Device (LPED), checking if a valid, official and blank tag is inserted and ready to be initialized. If all the needed verifications are valid, SINIAV Core sends a command with data to the LPED, which automatically and securely writes the data to the electronic plate. The success of the writing operation is then double checked with a reading request from Siniav Core, and LPED does the first encrypted reading of the electronic plate, using the Siniav Protocol.

Electronic Plate Configuration and Initialization – Data-Flow

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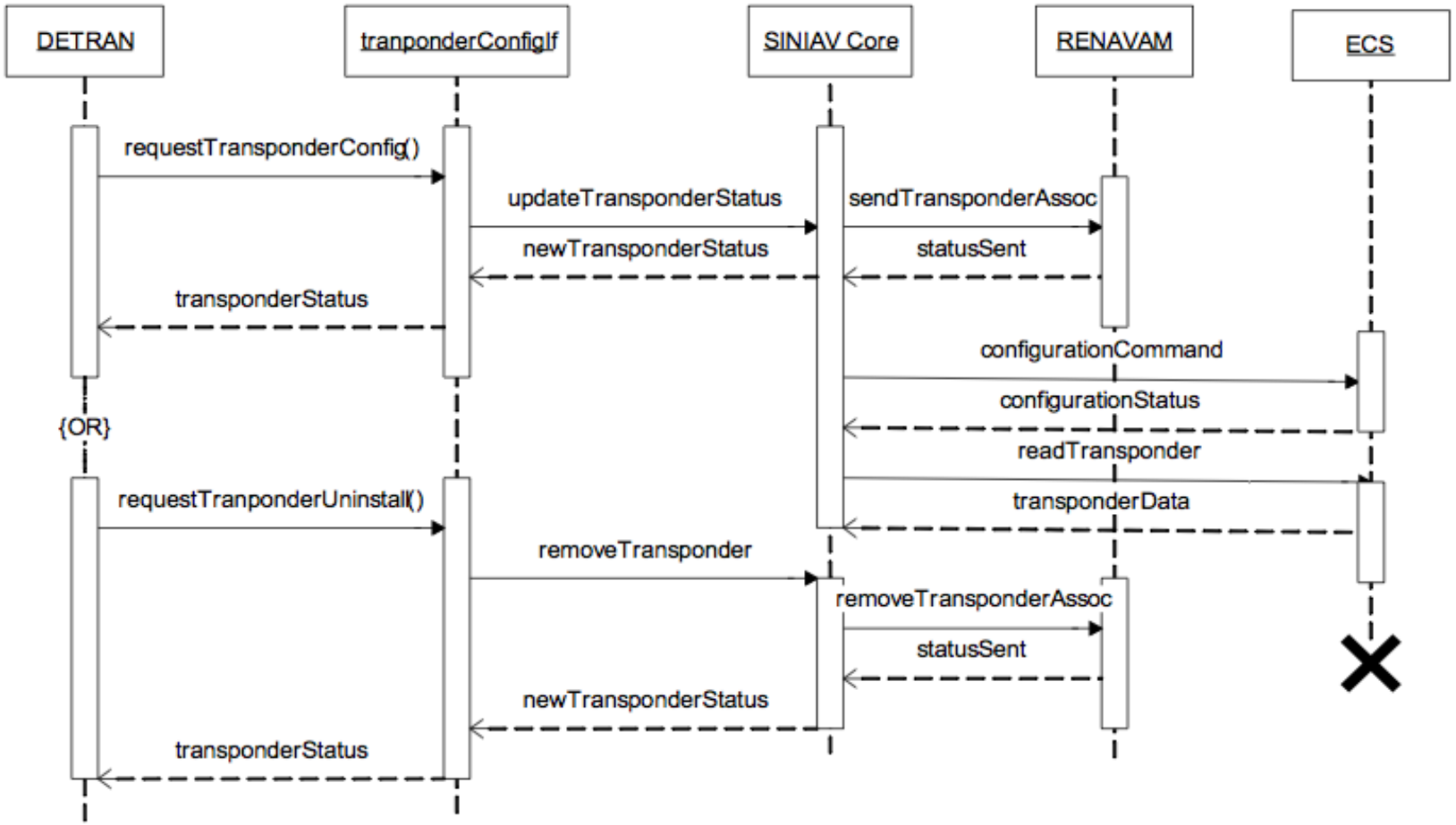
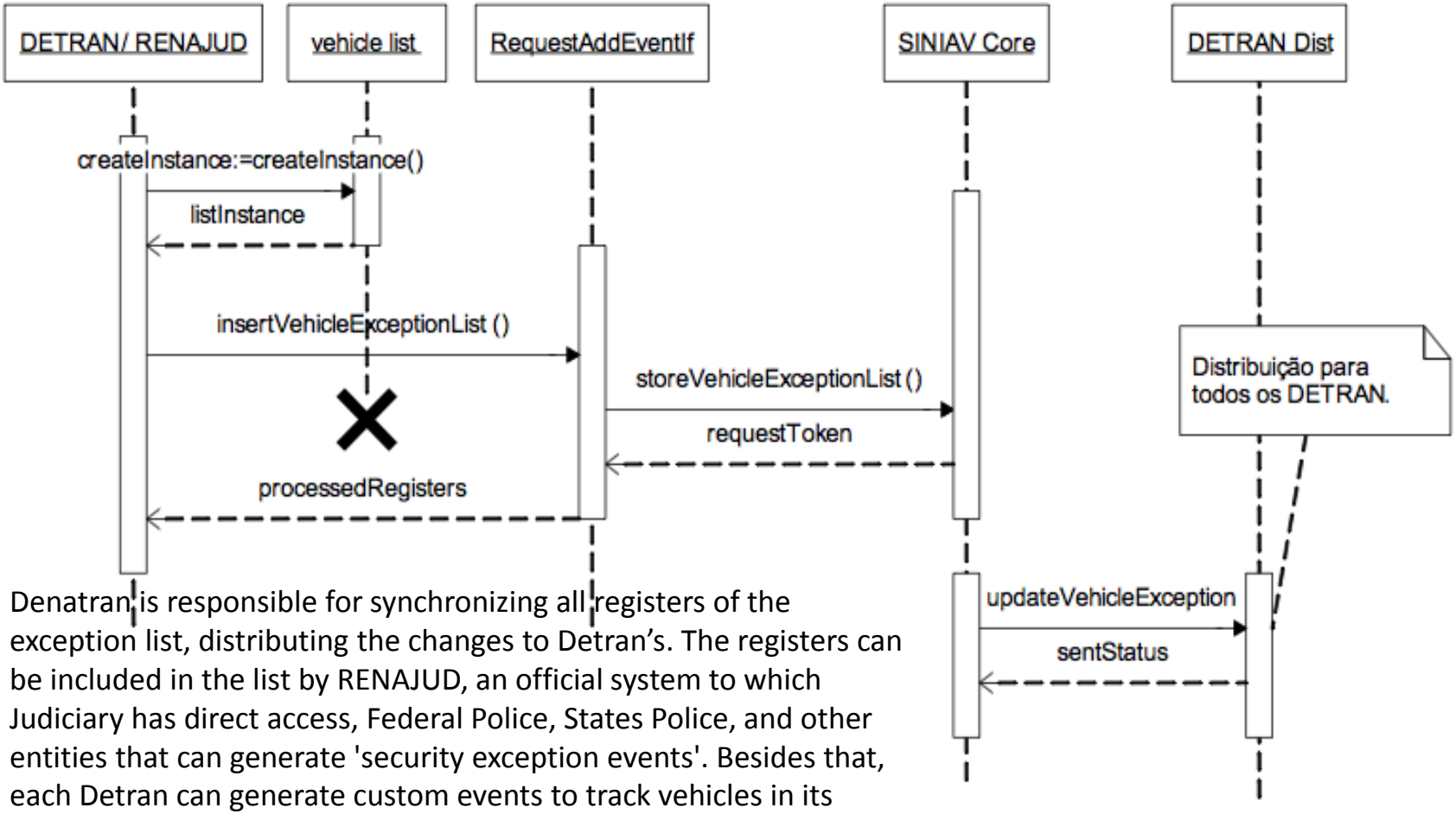


Exception List management



Denatran is responsible for synchronizing all registers of the exception list, distributing the changes to Detran's. The registers can be included in the list by RENAJUD, an official system to which Judiciary has direct access, Federal Police, States Police, and other entities that can generate 'security exception events'. Besides that, each Detran can generate custom events to track vehicles in its state, such as situations of debts.

SINIAV standards

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- VON BRAUN LABS is responsible for the technical definitions (BackOffice to Tag) on the Government side
- A Siniav Protocol was developed as Custom-Commands over ISO18000-6C standard
- This protocol was protected (patent-filled) to ensure competitiveness and interoperability among Siniav solution-providers
- Objective is to provide secure and standardized transponder-reader communication under royalty-free mechanisms
- This protocol is serving as a basis for Brazil's participation in International standards →

SINIAV standards

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- VON BRAUN LABS is actively participating in national and international RFID standardization activities, including:
  - Direction of Technical Commission ABNT/CE-21:031.07 - Automatic Identification and Data Capture Techniques - Security for Item Management, as part of the Brazilian Committee ABNT/CB-21 - Computers and Data Processing.
- Formal representation of ABNT Brazil and Head of Brazilian Delegation to the following ISO/IEC JTC 1/SC 31 working groups:
  - ISO/IEC JTC 1/SC 31/WG 4 - Radio frequency identification for item management, special groups SG1 and SG3;
  - ISO/IEC JTC 1/SC 31/WG 5 - Real time locating systems (RTLS); and
  - ISO/IEC JTC 1/SC 31/WG 7 - Automatic identification and data capture techniques - Security for item management.
  - GS1 EPCglobal HAG UHF Air Interface 1 and 2 Working Group (UHF AI 1&2 WG).

AES128 Encryption mechanisms on top of ISO18000-6C

SINIAV License-Plate Reference Platforms

- Ministry of Science and Technology request (from VON BRAUN LABS) a License-Plate Reference-Platform capable of implementing SINIAV [and other ISO-related] Protocols
- Semi-active solution already available (BOM+ manufacturing cost ~$4 for 10k units-order); Passive version first tape-outs already achieved (product-stage in 2012 @ ~$0.20)
- Government offers direct access (no fee) to Semi-active design; Chip availability (passive) in one year (for OEMs to develop sticker-casings).

SINIAV License-Plate Reference Platforms

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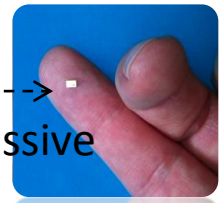
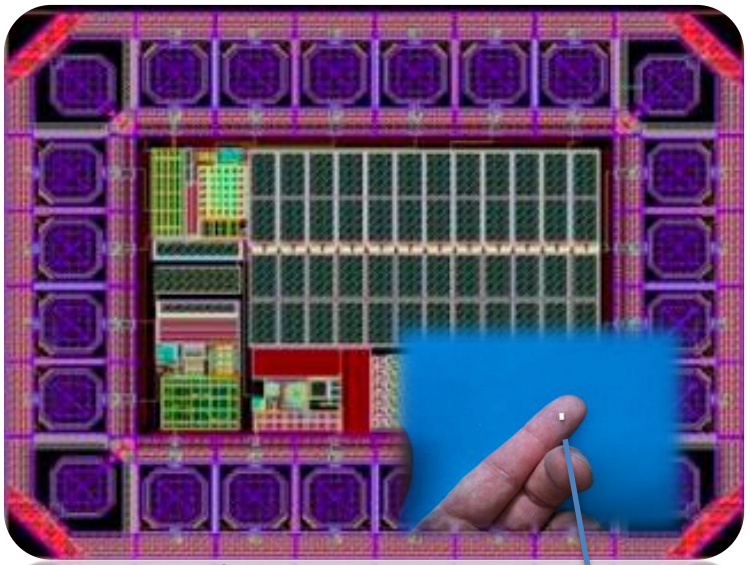
Semi-Active



Passive



IC-design of the Passive version:
VONBRAUNLABS and other IC DHs

Passive

Semi-Active

Centro de Tecnologia da Informação Renato Archer

certi

FIT

CPqD

USP

CETENE
CENTRO DE TECNOLOGIAS ESTRATÉGICAS DO NORDESTE

LSITEC
Laboratório de Sistemas Integráveis Tecnológico

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Brazilian
R&D
Institutions

CMs/OEMs

Industry-
partners

Solution-
Providers

Other R&D partners

Collaboration

SEMICONDUCTOR FOUNDRIES

Local-State BackOffice

License-Plate Emission Site

MLFF architecture

SINIAV Pilot in Rio de Janeiro (April, 2011)

SINIAV was designed to MLFF in urban and Hways' environments

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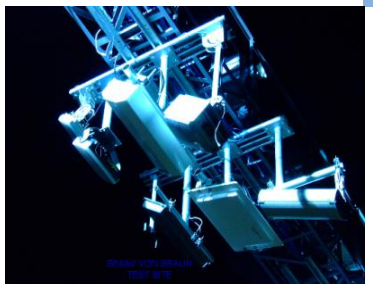
- VON BRAUN LABS developed technical requirements in accordance to the SINIAV Regulations to work in Multi-Lane Free-Flow → solution does not rely on the physical layer (frequency or Tag devices).

Private developments in RJ

Private developments in SP



VON BRAUN LABS Test-site

SINIAV is the base for Electronic Invoicing

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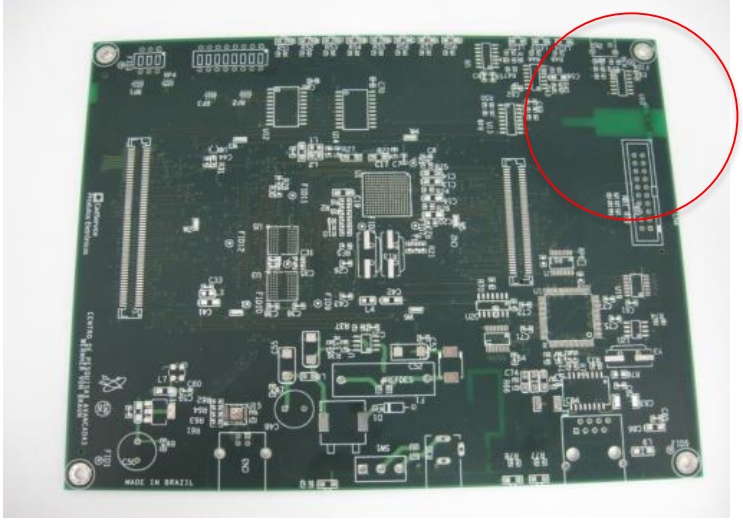
- **Brasil-ID is a system developed by VON BRAUN LABS with all Brazilian States plus the Brazilian equivalent to "IRS" →**
- It embeds Siniav/ISO18000-6C-ISO29167 RFID devices into Products / Cargo Seals as an unique/indelible ID containing all Fiscal [Invoicing] information;
- Electronic Invoicing is already a well-established system in Brazil (over $2 trillion Invoice-value transactions treated by the system); Brasil-ID is the mirror-application of the e-Fiscal Invoice in the products themselves.



Example: embedded SINIAV chip into a Notebook Printed Circuit-Board Manufactured in Brazil → Fiscal Document embedded into the product – facilitates Logistics and diminishes fraud/robbery

Ciência e Tecnologia
Ministério da Ciência e Tecnologia

Português | Inglês | Espanhol

Brasil id
www.brasil-id.org.br

Ministério da Ciência e Tecnologia | CONFAZ Conselho Nacional de Política Fazendária | ENCAT | Receita Federal | Wernher von Braun

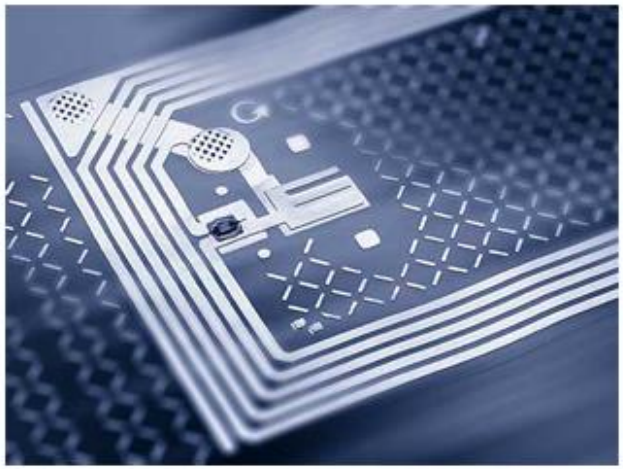


Imagem: www.tri-c.edu

Seja bem vindo(a) ao novo site do BrasilID, Sistema Nacional de Identificação, Rastreamento e Autenticação de Mercadorias.

Sistema baseado na tecnologia de Identificação por Radiofreqüência (RFID) e outras de comunicação sem-fio relacionadas, visa estabelecer um padrão único para implementação de Identificação por Radiofreqüência a ser utilizado em produtos e documentos fiscais em circulação pelo país, prevê, ainda, a estruturação de serviços de rastreamento e verificação de autenticidade. Saiba mais

Área Restrita

Área reservada à equipe técnica, entidades e empresas envolvidas

LOGIN:

SENHA:

Esqueci meus dados

ENTRAR

Institucional

- O que é o Brasil-ID
- O que é é o ENCAT
- O que é o CPA Wernher von Braun
- Press Release in English

Eventos

28/03/2011 à 01/04/2011
Seminário da Abinee – Associação Brasileira da Indústria Eletro e Eletrônica

02/05/2011 à 04/05/2011
16º CARDS Payment e Identification 2011

+ mais

Comunicados e Notícias

Vídeos

www.brasil-id.org.br

DOU n. 211, Seção 3, Pág. 8 de 5-11-2009

DOU n. 25, Seção 3, Pág. 8 de 5-02-2011


SINIAV and Brasil-ID are fully integrated and contemplate several sub-systems from players of the Supply-Chain in different segments
Panarello. A Distribuidora dos Goianos.
PANARELLO
STO FISCAL J.K.
SEFAZ
ATENDIMENTO GERAL

SINIAV, BRASIL-ID and SINRAV are combined in one single system to vehicle and cargo ID, Tracking and Security operations.

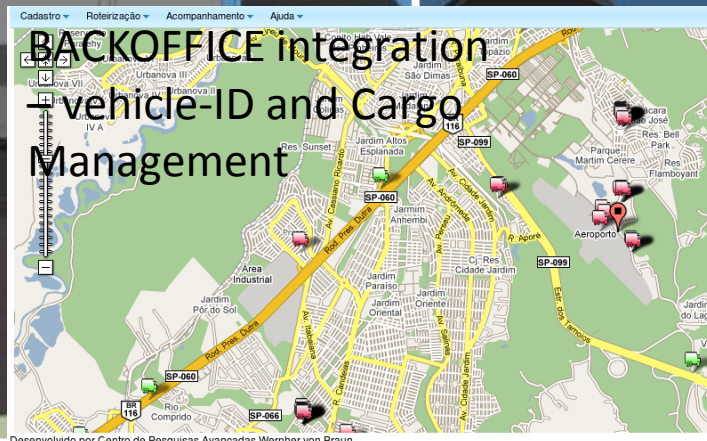
GPS

SINIAV transponder

Control unit

RFID reading system

BACKOFFICE integration – vehicle-ID and Cargo Management



SINIAV and SINRAV as mechanisms for Brasil-ID in operation

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- Cargo has SINIAV RF-ID embedded into products (Fiscal Invoice and Cargo Manifest); RFID-Reader is combined with GPS/GPRS equipment at the critical points of the operation (including cargo-trucks containers); Vehicle-ID is SINIAV's in Open-Road structures at the Fiscal Check-Points.
- Back-Office(s) of all systems converge.

Brasil-ID Pilots

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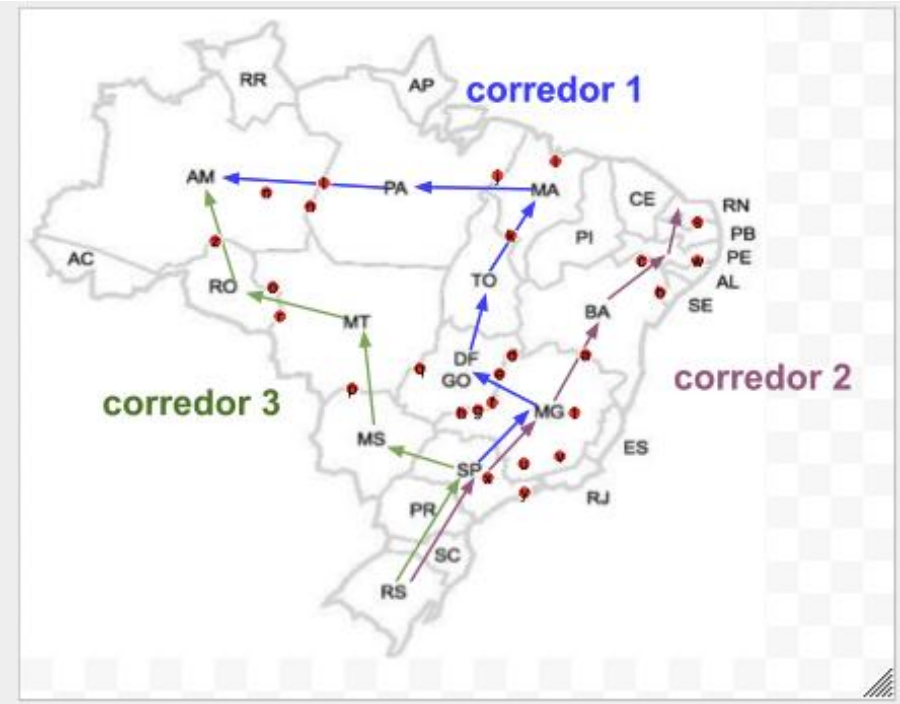
- Pilots under test in 16 States crossing the main inter-states routes in Brazil;
- **Corridor 1** = Southwest / Center-West/ Norte (SP, MG, GO, TO, MA, PA, AM)
- **Corridor 2** = South / Northeast – BR-116 (RS, SP, MG, BA, PE, RN)
- **Corridor 3** = Southeast / North (RS, SP, MS, MT, RO, AM)



VON BRAUN LABS IS COORDINATING BRASIL-ID PILOTS AND TECHNOLOGY DEVELOPMENT W/ 8 R&D CENTERS; 16 STATES, MORE THAN 80 COMPANIES; FEDERAL AND STATE-LEVEL GOVERNMENT-AGENCIES INVOLVED; BRAZIL'S AREA IS BIGGER THAN CONTINENTAL US

Von Braun Center HQ in Campinas-SP, Brazil

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