



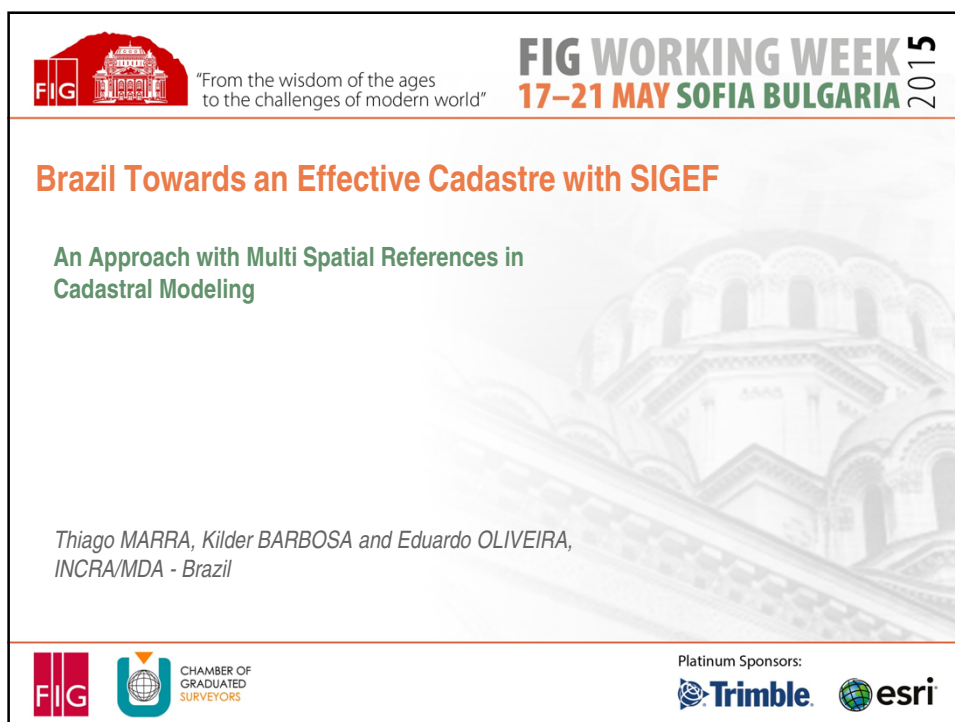
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Brazil Towards an Effective Cadastre with SIGEF

An Approach with Multi Spatial References in Cadastral Modeling

*Thiago MARRA, Kilder BARBOSA and Eduardo OLIVEIRA,
INCRA/MDA - Brazil*

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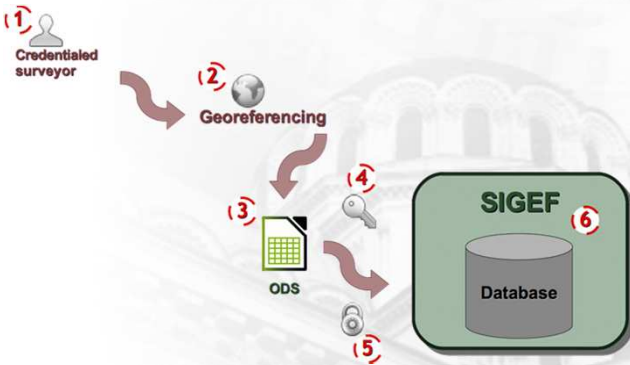
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What is Sigef?


A Web based platform supplied by **credentialed surveyors** for **Reception + Validation + Organization + Storage...**



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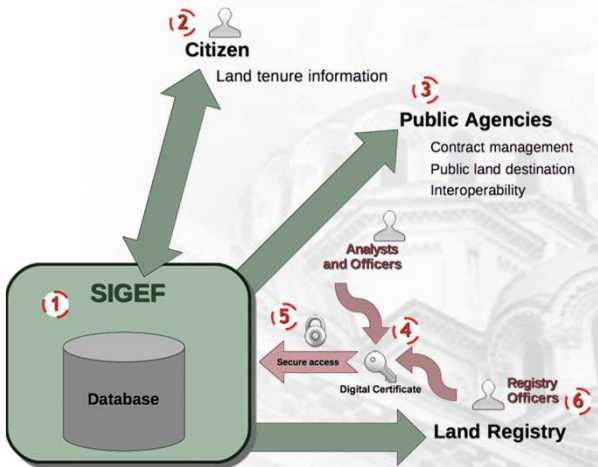
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What is Sigef?


A Web based platform supplied by **credentialed surveyors** for **Reception + Validation + Organization + Storage + Updating + Publication of cadastral data.**
Enables a direct connection to **Land Administration** and **Land Registry** to manage **rights, restrictions and responsibilities.**



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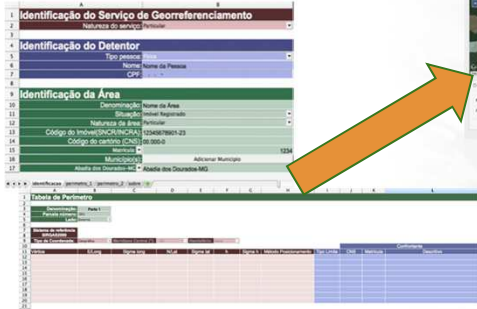
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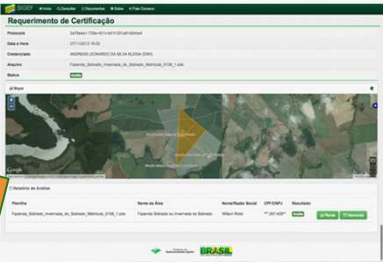
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What is Sigef?

Open Document Spreadsheet





Web Application




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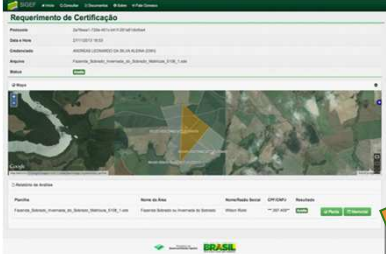
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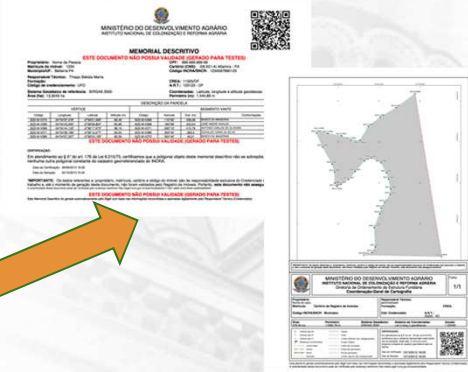
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What is Sigef?

Web Application





Documents




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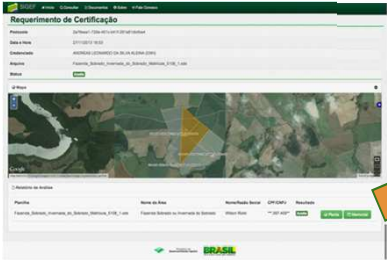
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What is Sigef?

Web Application



Online Data

Informações de Registro

Cartório: cartório do unico oficio de brasil novo



Município - UF: Brasil Novo - PA

Código Nacional de Serventia (CNS): 08.716-5



Matrícula: 1234


Situação do Registro: Não confirmado

Code	X	Y	Z	Area	Perimetro	Proprietario
CXF-M-8945	-52°27'24.101"	0.00	-3°39'20.142"	0.00	95,79	0,01
CXF-M-8947	-52°27'31.859"	0,01	-3°39'40,070"	0,01	97,82	0,03
CXF-M-9720	-52°27'32,558"	0,05	-3°39'41,108"	0,02	99,07	0,09
CXF-P-4918	-52°27'34,583"	0,00	-3°39'39,860"	0,00	100,71	0,00
CXF-P-4919	-52°27'34,895"	0,00	-3°39'37,868"	0,00	100,71	0,00
CXF-P-4920	-52°27'35,922"	0,00	-3°39'36,842"	0,00	100,71	0,00

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Spatial Data Model


How to deal with cadastral data in a continental area country?



Input

- Coordinates representing vertices, boundaries and parcels



Coherent Outputs

- Unitary: measures (area, distances and angles)
- Contextual: neighborhood, "layer processing"



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Traditional Approach

One cartographic projection for the **whole** area
→ Usually related to analog cadastre

"The plane of reference is on the paper"







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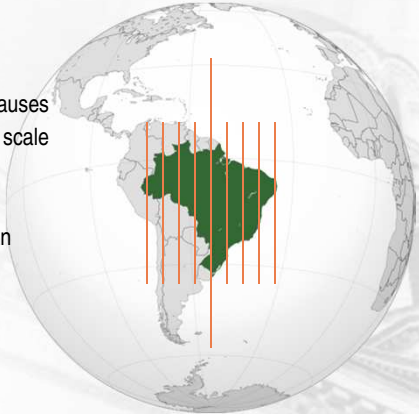
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Traditional Issues

For Brazil?



- A general projection fulfills the "contextual need" but causes unacceptable distortions in measurements for cadastral scale
→ **Incoherence with physical situation**
- Local projections solve the measurements issues for an isolated parcel, but complicates the contextual view
→ **Incoherence between neighbours**
→ **Impossibility to use the dataset as a layer**




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The Implemented Approach

Digital Cadastre Modeling
One data input, one geodetic reference system (SIRGAS2000), but transformed dynamically using different spatial reference systems for each output:

- Area** → local projection (*Local Geodetic System*)
- Length** → horizontal distance from 3D coordinates (X,Y,Z)
- Angles and "Context"** → ellipsoid geodetic coordinates (φ, λ)



Results


Coherent Outputs

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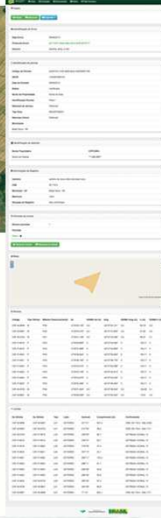


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Thank You!

<https://sigef.incra.gov.br/>
<http://acervofundario.incra.gov.br/i3geo/>

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