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The Intelligent Cadastre

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FIG Commission 7/3 Workshop on Crowdsourcing of Land Information

St Juliens, Malta

16-20 November 2015



FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

What is 'intelligent'?

- Having or showing intelligence, especially of a high level



What is 'intelligence'?

- The ability to acquire and apply knowledge and skills



What is 'artificial intelligence' (or AI)?

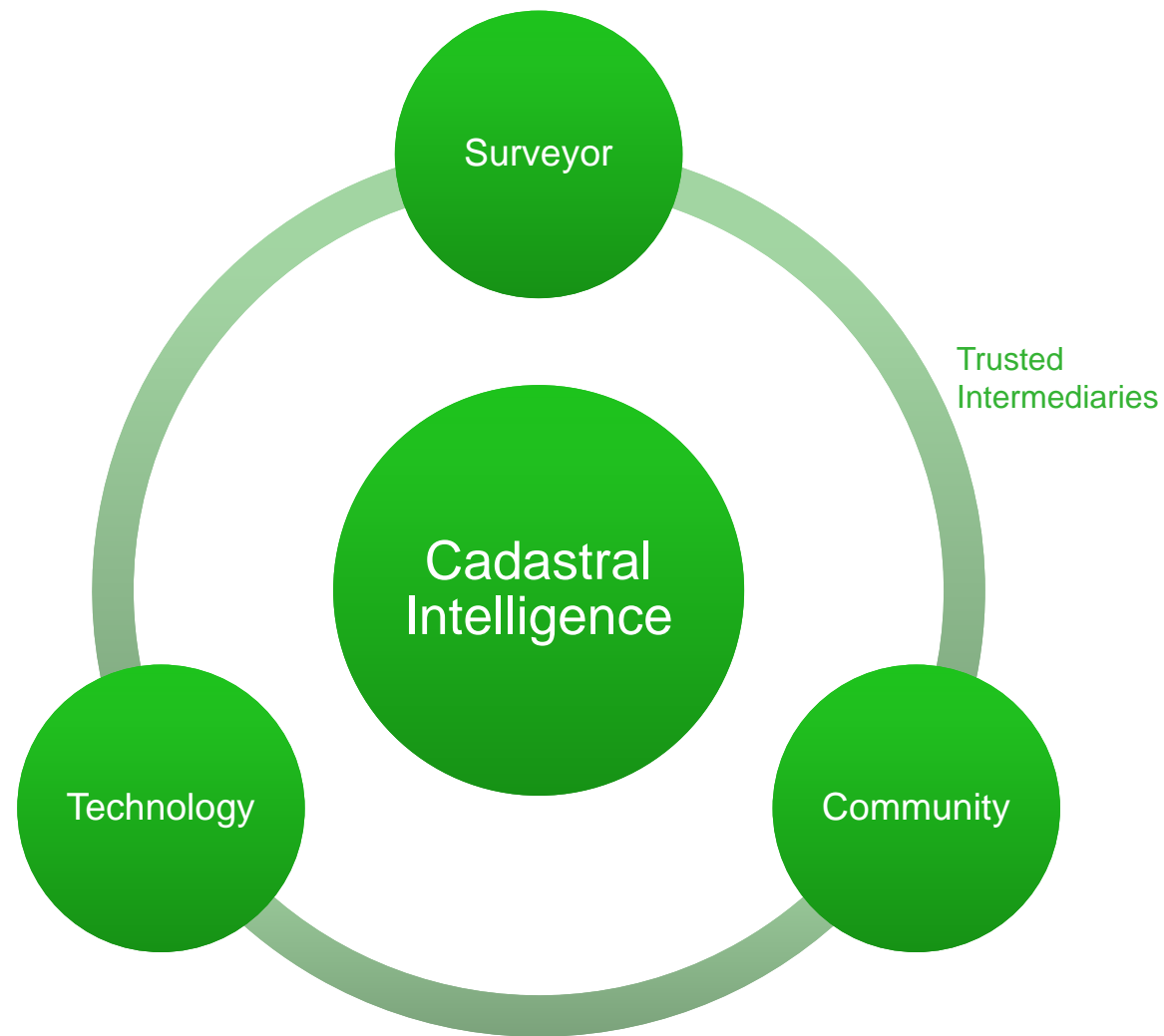
- The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.



What about 'cadastral intelligence'?

- The ability to acquire and apply knowledge and skills on people-to-land relationships

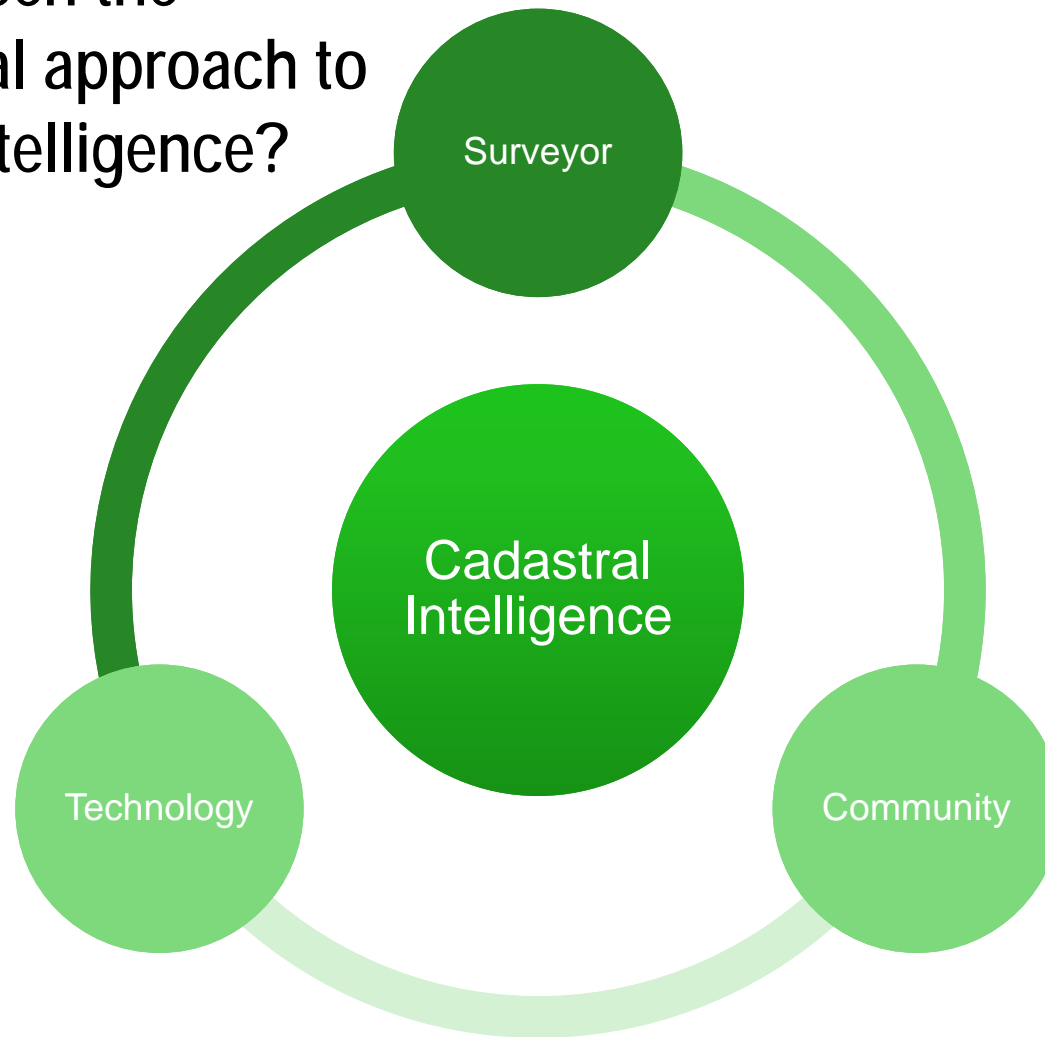




Let us place cadastral intelligence in the context of key arguments from the land sector

1. Amongst other things*, A society requires appropriate levels of cadastral intelligence to create and maintain a cadastre – that ultimately contributes to sustainable development
2. In the era of the ‘networked society’ and ‘good land governance’ cadastral intelligence should be spread across many actors

What has been the
conventional approach to
cadastral intelligence?



Indeed, this is where most 'cadastral intelligence' still sits



Creating someone with this high level of 'cadastral intelligence' takes lots of effort*

- 6 years of primary school education
- 6 years of high school education
- 4 years of tertiary education
- 2 years of on-job or certification training
- 300,000 EU worth of training costs (very rough estimate)
- ...and we haven't even paid for a day of surveying yet
-and we haven't even paid for equipment yet



There simply isn't enough conventional surveyors...

The screenshot shows the GIM International website. At the top, there's a navigation bar with the GIM logo, the tagline "Mapping the world", and a search bar. Below the navigation bar, there's a banner for "MEET YOUR A-TEAM" with the Trimble logo. The main content area features an article titled "How Big is Global Insecurity of Tenure?" dated 06/11/2015. The article includes a photo of a man and text discussing World Statistics Day. To the right of the article, there are two promotional banners: one for "Accuracy & Productivity Matter" and another for "GNSS + Inertial Precise Positioning and Orientation".

GIM INTERNATIONAL Mapping the world

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MEET YOUR A-TEAM Trimble

Article

How Big is Global Insecurity of Tenure? - 06/11/2015

World Statistics Day, as declared by the United Nations Statistical Commission, was celebrated on 20 October 2015. Official statistics are crucial to help decision-makers develop informed policies that impact millions of people. Improved data sources, sound statistical methods, new technologies and strengthened statistical systems enable better decisions that eventually result in better lives for us all. One of the #StatsDay15 tweets highlighted that "70% of the world's population have no access to formal land administration services and have no security of tenure".

This particular statistic both intrigued and worried me since I know the source of the figure.

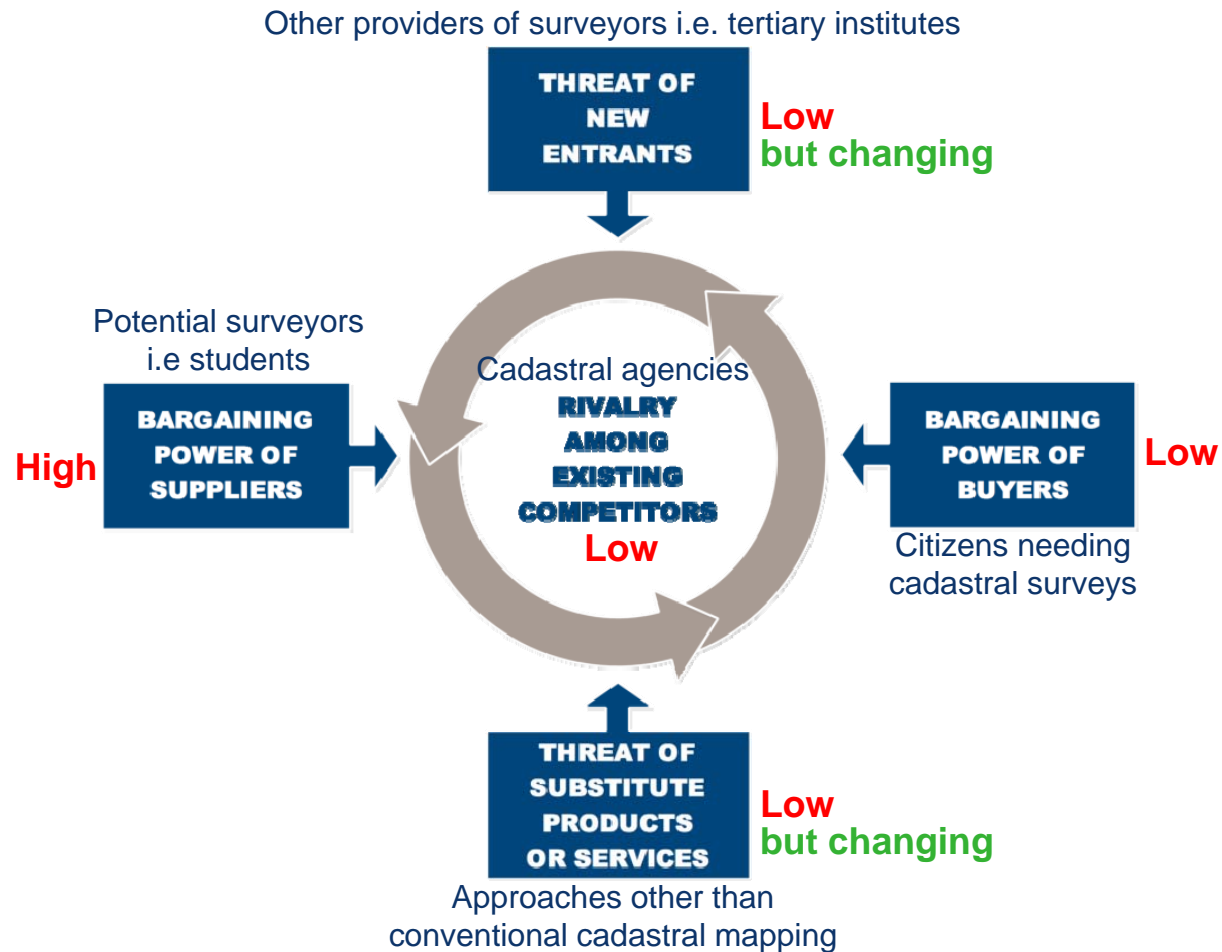
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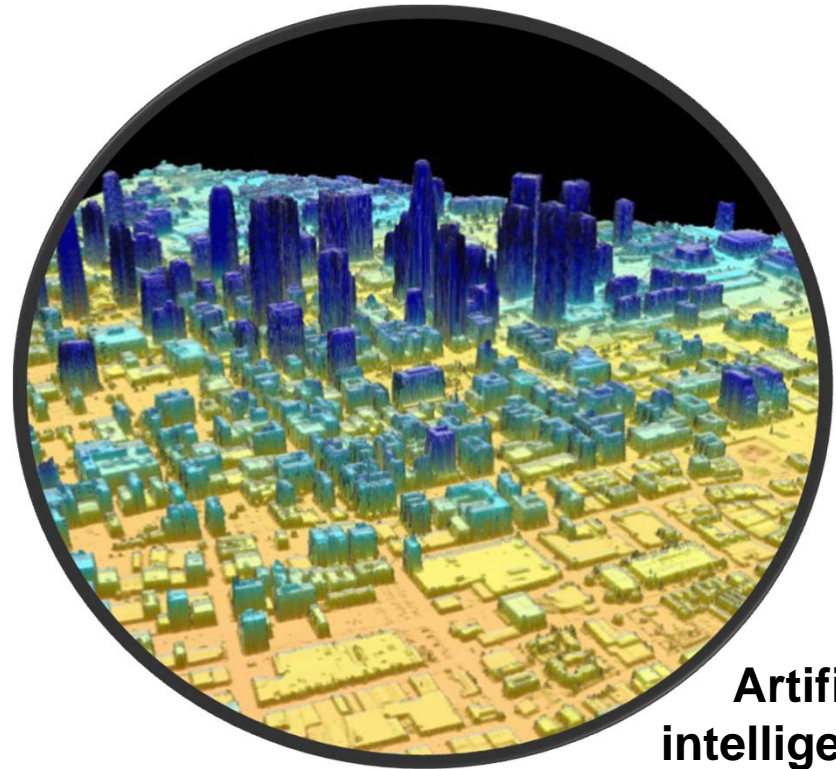
Why is this the case? Let look at Porter's 5 forces...



Let's give a big warm welcome to the reviving forms of cadastral intelligence...



**Local
intelligence**
mandated masses



**Artificial
intelligence**
cadastrobots



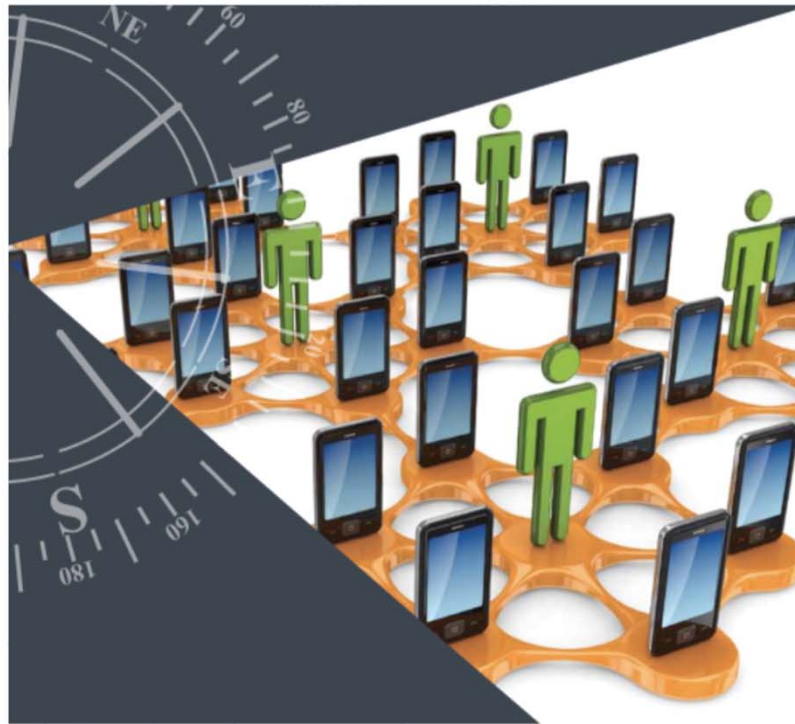
the
mandated
masses

Report November 2011

RICS RESEARCH

Crowdsourcing Support of Land Administration

A new, collaborative partnership between
citizens and land professionals



rics.org/research



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CROWDSOURCING (1)

The Crowdsourced Cadastre

There is nothing new under the sun. Or is there? Cadastral practitioners are becoming increasingly interested in 'crowdsourcing'. Using location-enabled mobile phones, citizens could themselves perform – at least partially – adjudication, surveying, demarcation, and recordation. Some suggest it could revolutionise cadastral establishment and maintenance. At first glance the concept appears highly innovative. It could help lower costs of registration, speed up recording, deliver more complete cadastral coverage, and improve the relationship between citizens and their governments. But, have we been through all this before? As part of *BIM International's* dialogue on Cadastre 2034, the authors discuss the potential of crowdsourcing applied to cadastres.

On the surface, proponents of crowdsourced cadastres appear to be agitating for the deconstruction or circumvention of the well established cadastral and land registration institutions. They deliver a warning, one Daniel Heberge, current chair of Commission 7 of the International Federation of Surveyors (FIG),

expressed in *FIG Man's 2012* when more than 95% of the world's billion land interests remain unregistered. At current rates it will take decades or centuries to get near full registration in some places. By putting aside the debate as to whether land records actually result in economic and social development, the majority

of land administration experts that we meet, invest, develop, and more fit-for-purpose mechanisms for building and maintaining cadastres to rising countries, if not to global, in the long run crowdsourced cadastres provide another instrument in the expanding land administration toolbox.

BEYOND THE HYPE

So where then are these crowdsourced cadastres? On the topographic or street map applications, where services such as OpenStreetMap are leading the way, crowdsourced cadastres are not as prominent. Indeed, Professor Rob van Tol, co-chair of *FIG's* Commission 7, recently provided his own view on this during his address at the *World*



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....some followers

The mandated masses could go in a few directions with respect to conventional cadastres...

1. **Collaborators:** crowdsourced land recording could supporting or supplement existing land administration systems (e.g. a tool used by government)




2. **Self Starters:** crowdsourced land recording fills the gaps where formal systems do not exist, or have failed (e.g. customary lands, slums)



3. **Rebels:** crowdsourced land recording could be used to challenge existing land administration systems (e.g. land grabs, cases of dispute)





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Geomajas is the open source platform to create Web GIS applications

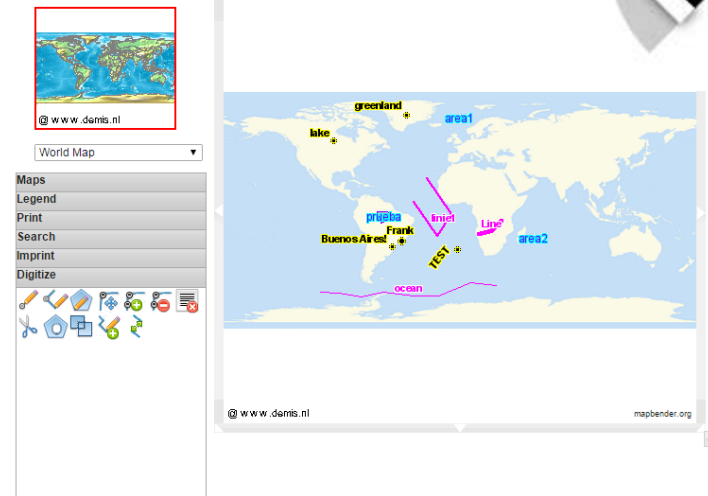
- Display & edit geographic data from multiple sources
- Out-of-the-box functionality through plugins & map widgets
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GeoMoose



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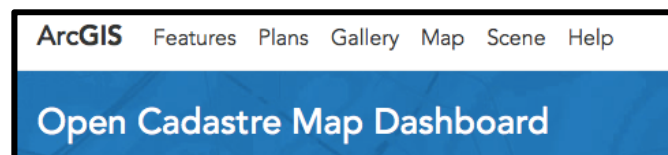
BUILDING UAS CAPACITY FOR THE LAND ADMINISTRATION SECTOR

From Barefoot to 'Air-foot' Surveyors

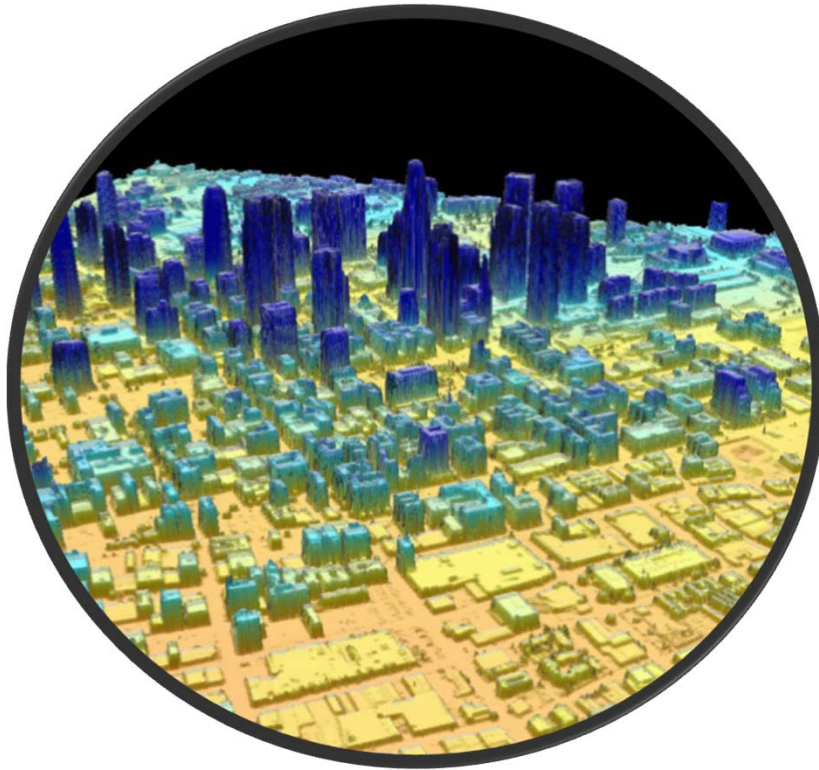
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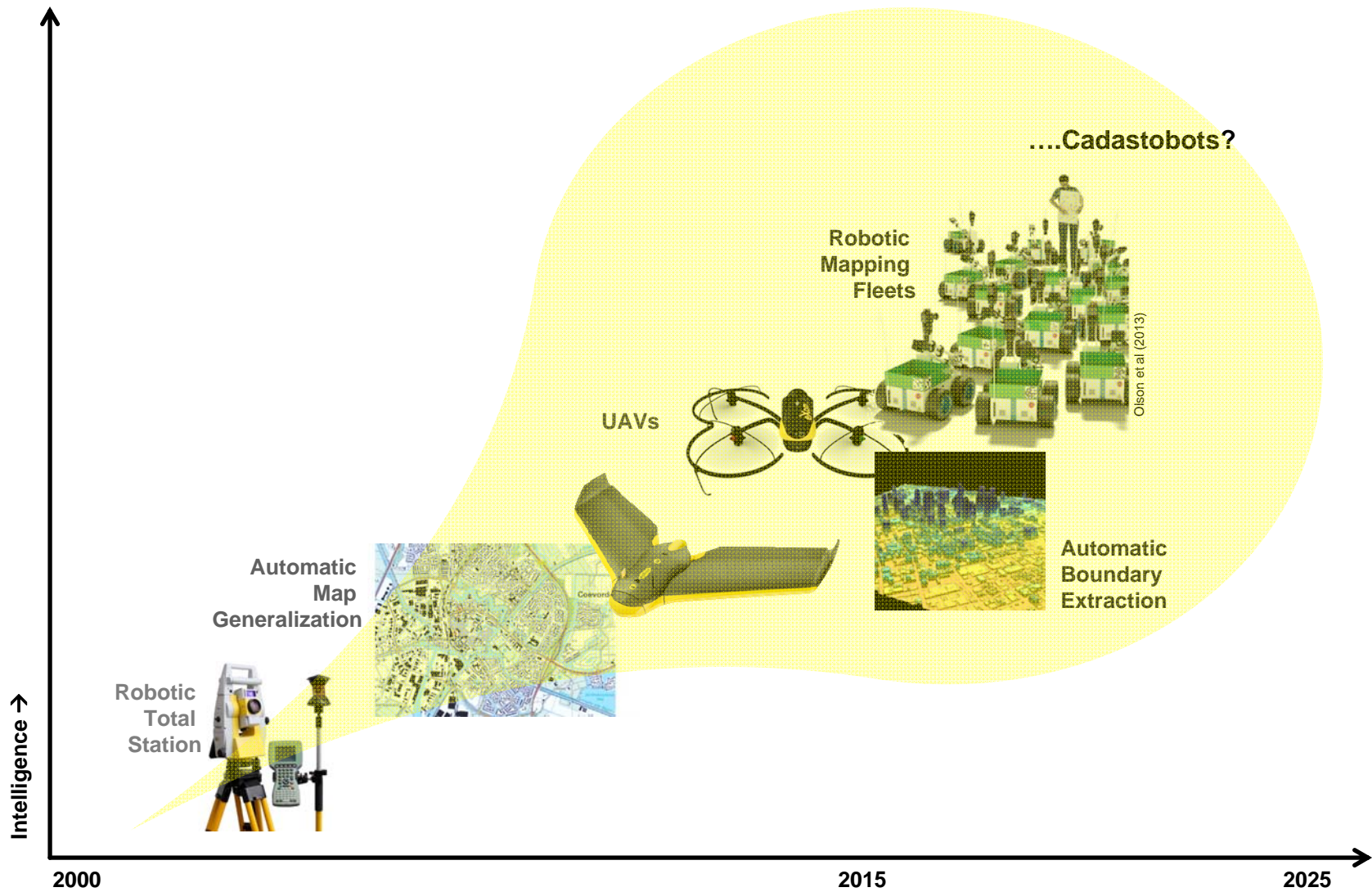
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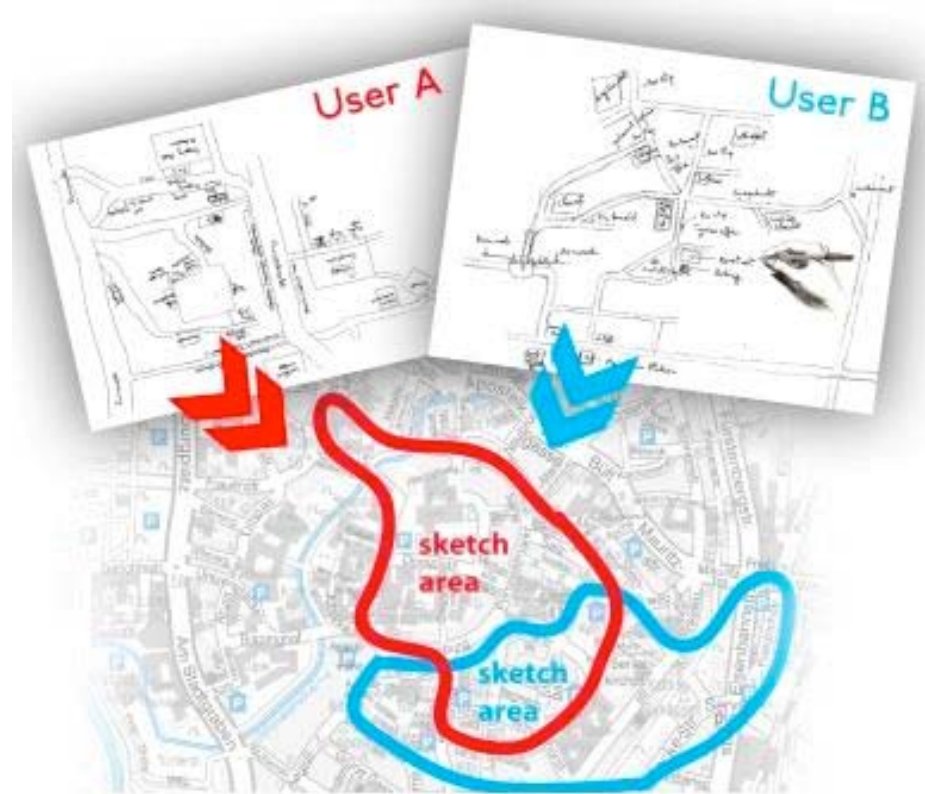


the cadastrorobots



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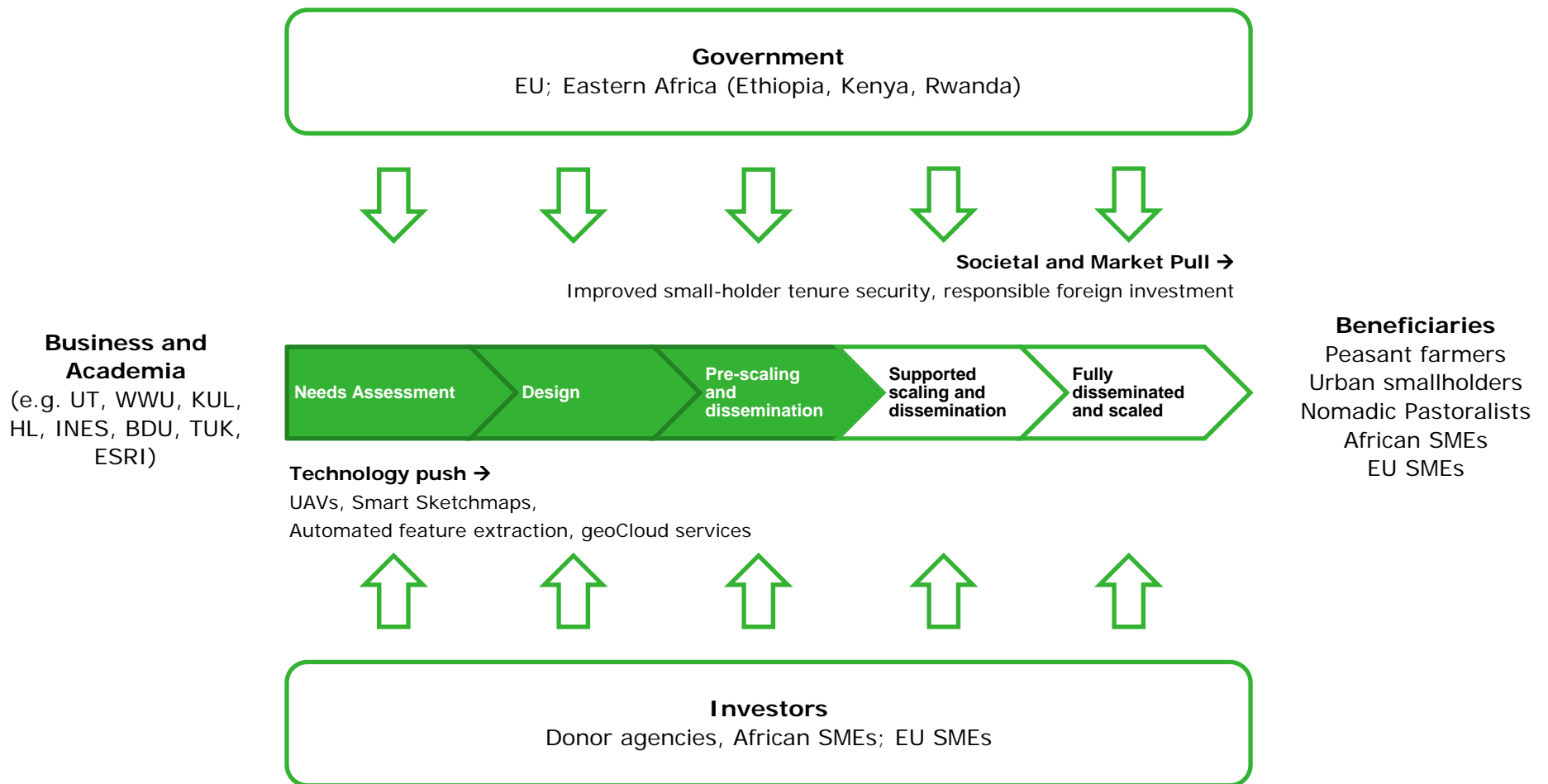
HORIZON 2020

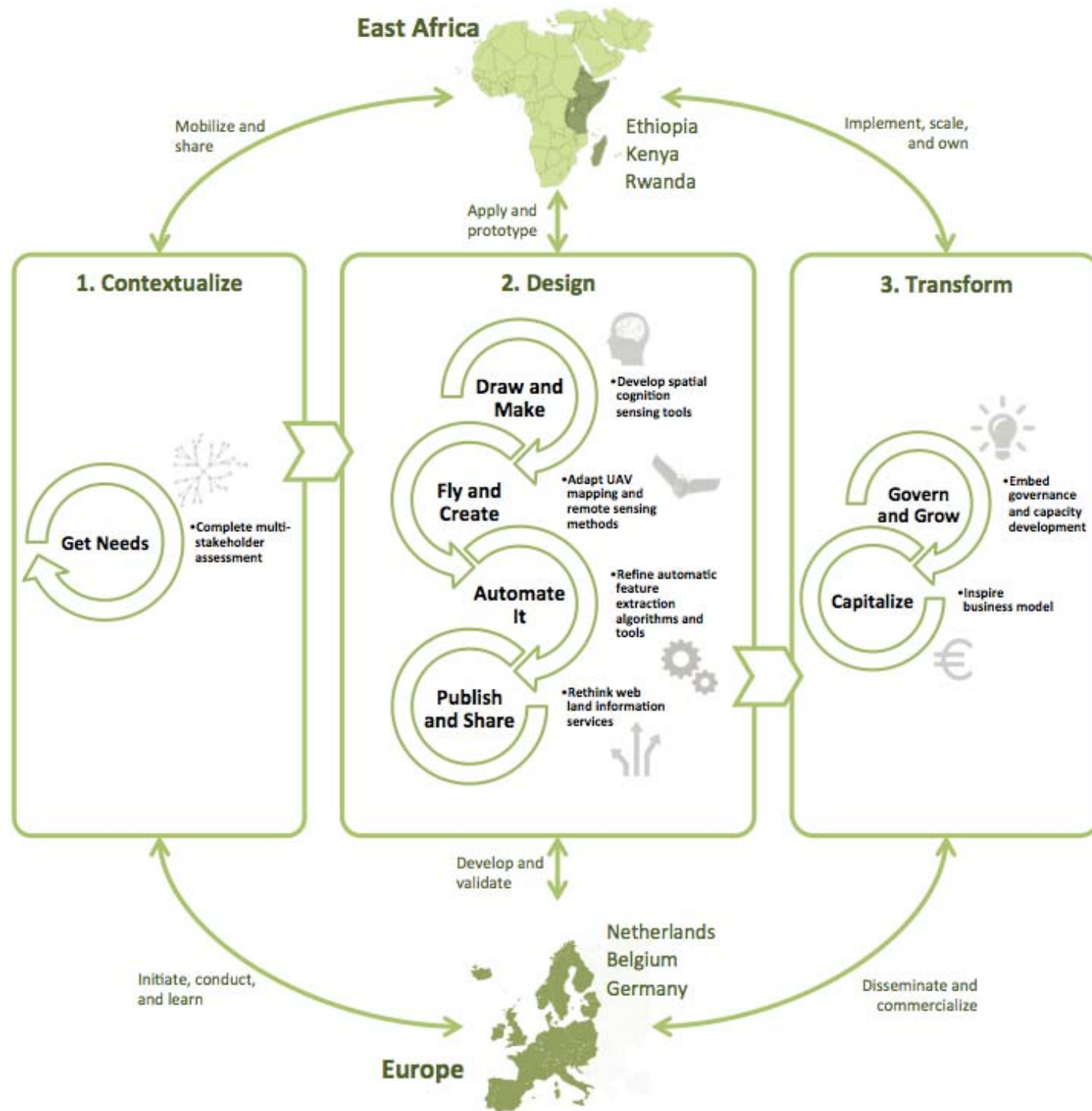
The image is a conceptual graphic for the Horizon 2020 program. It features a dark blue background with a glowing horizon line. A small, transparent globe of the Earth is positioned at the center of the horizon, acting as a lens. Bright, ethereal light rays radiate from behind the globe, creating a sense of depth and focus. The text "HORIZON 2020" is written in a clean, white, sans-serif font, centered horizontally and partially overlaid by the light rays and the globe.

its4land details

- 3.9M EU
- 4 years
- 2 continents
- 6 countries
- 8 consortium members
- 8 work packages
- 3 specific land tenure challenges
- R&D > Implementation/Scaling







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Thanks

Will you tackle the threat, embrace the opportunity, or something in between?



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Let's get the discussion going with a *hypothetical*...

- **The mandated masses and cadastrorobots are coming...**
 - Automation of most cadastral tasks is inevitable
 - There will be no surveyors in the field within 20 years
 - Community leaders and citizens will do the work
 - They will be assisted by the cadastrorobots
 - Surveyors will be system experts, managers, leaders, and advisors

- **Sounds crazy...?**
 - Kees de Zeeuw (2015)
 - *“Kadaster reduced it's workforce from 2600 to 1500 in 8 years.”*