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May 2-6, 2016 in Christchurch, New Zealand

# Cadastral Intelligence, Mandated Mobs, and the Rise of the Cadastrobots

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FIG Working Week

Christchurch New Zealand

May 2016



FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

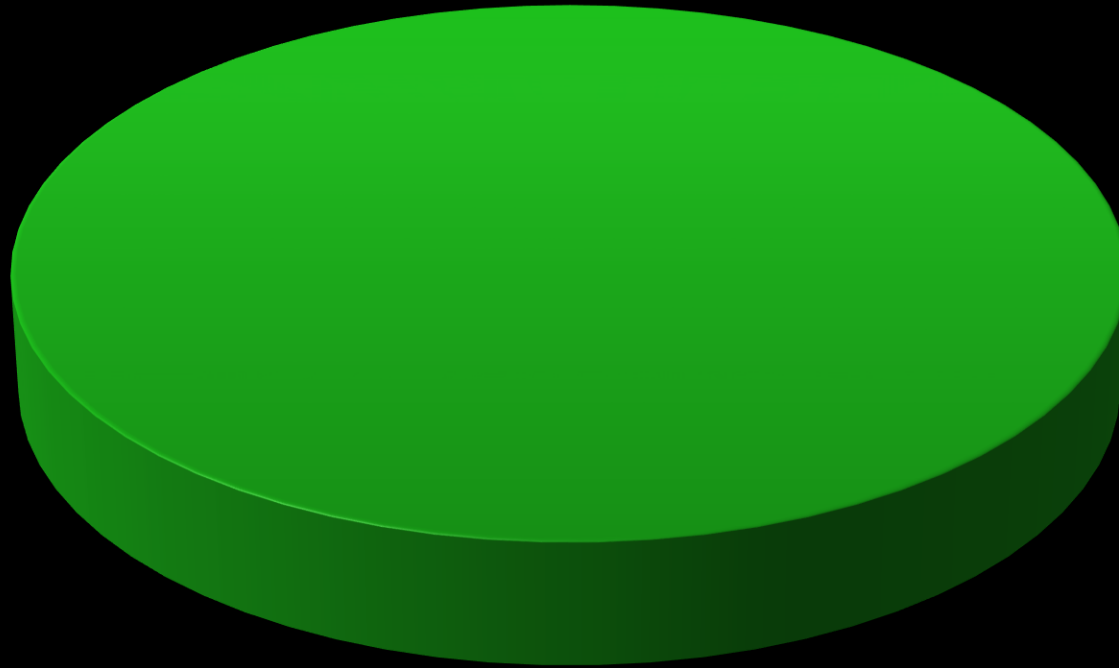
*'Kadaster Netherlands reduced  
it's workforce from 2600 to 1500  
in 8 years'*

Kees de Zeeuw (2015)  
Kadaster International

**‘Cadastral intelligence’** is the  
to ability acquire knowledge and  
apply spatial and social skills  
about the relationship between  
people, rights, and land

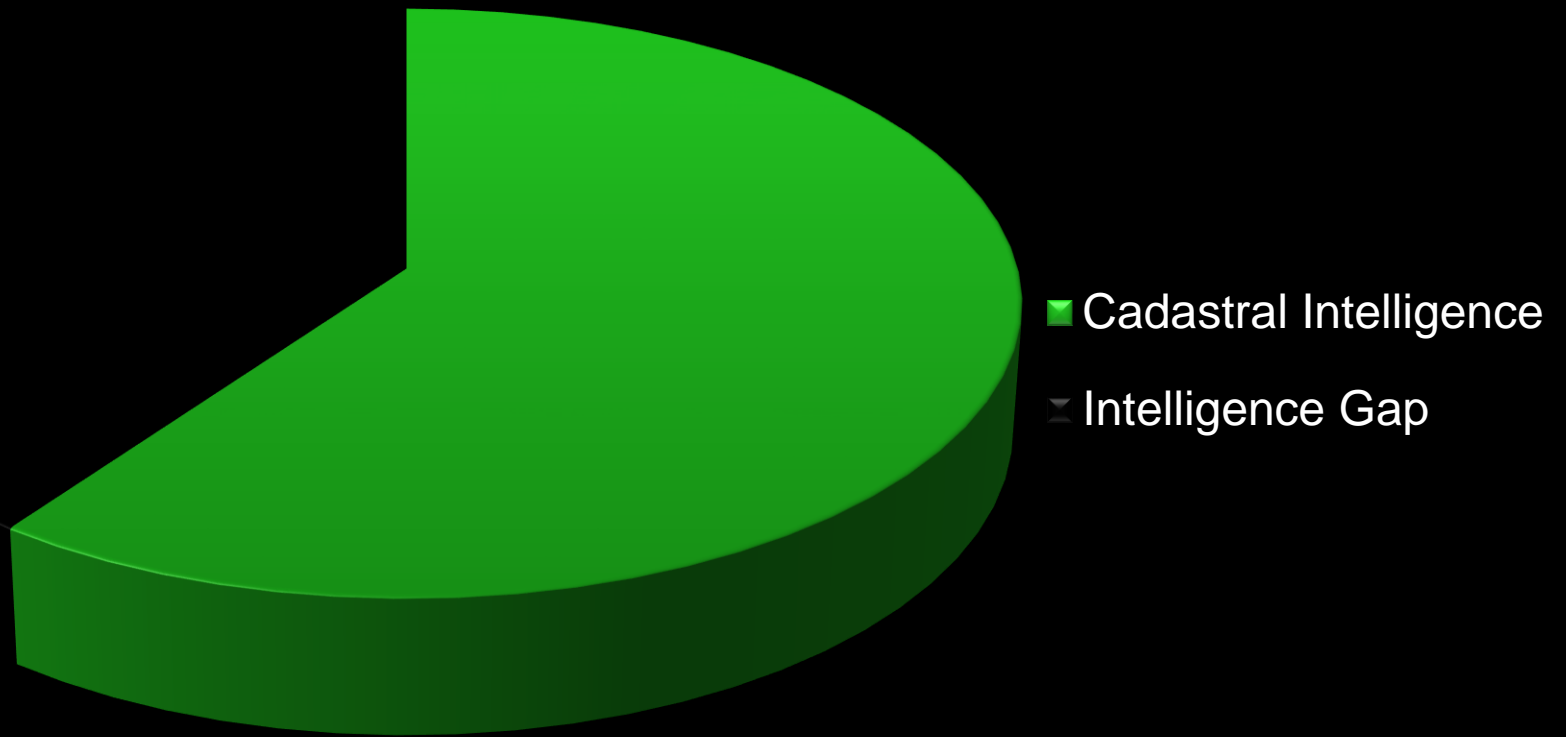
Within a country, an  
**appropriate level** of cadastral  
intelligence is needed to ensure  
cadastres are complete, up-to-  
date, respected – and ultimately  
contributing to the common  
good

**Put simply, a complete pie means there is enough cadastral intelligence to go round**



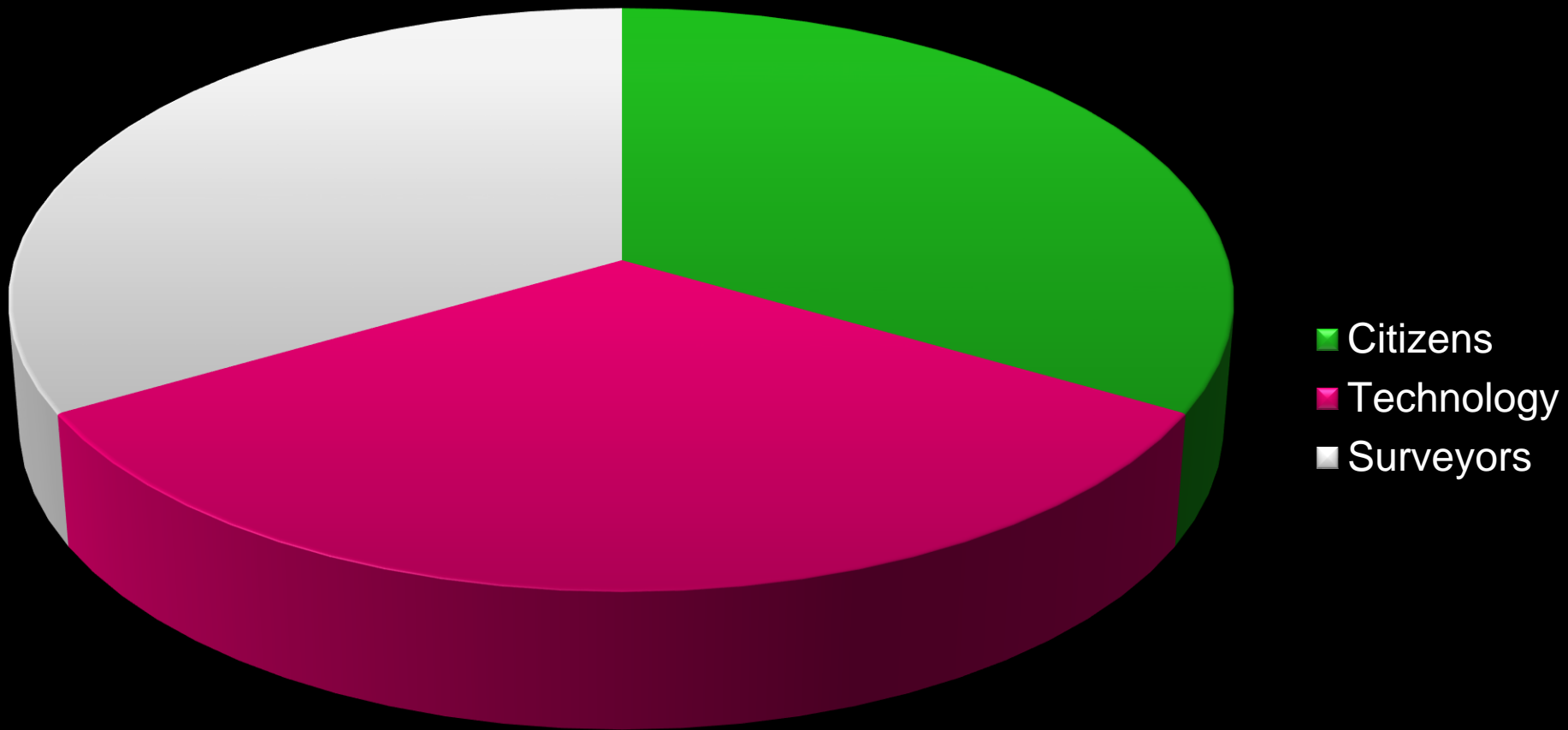
■ Total Cadastral Intelligence

**In about 70% of contexts we appear to have a cadastral intelligence gap**



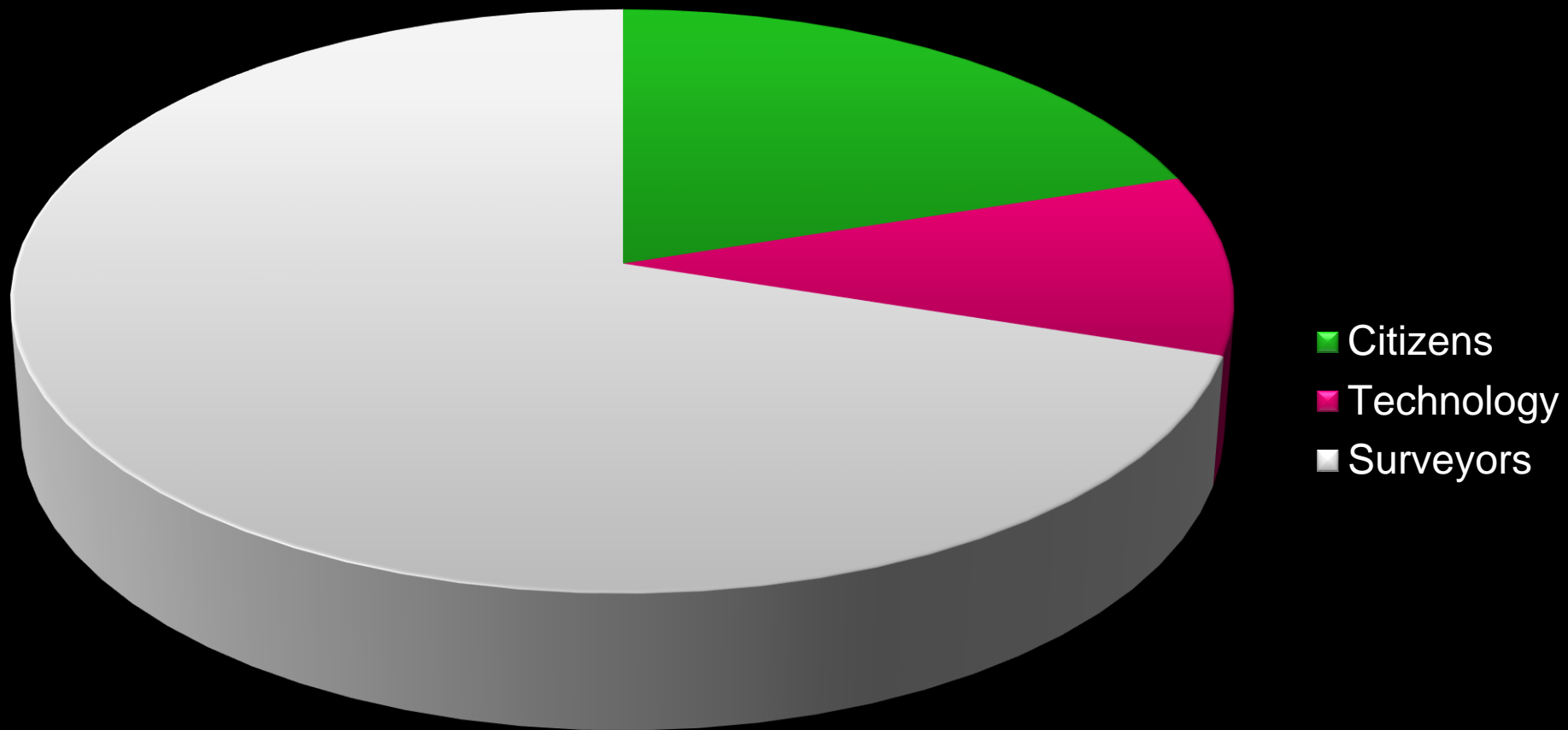
Cadastral intelligence is held by  
different sectors: **different**  
**actors** can hold different levels  
of cadastral intelligence

# Surveyors, citizens, and technology – the three main holders of cadastral intelligence



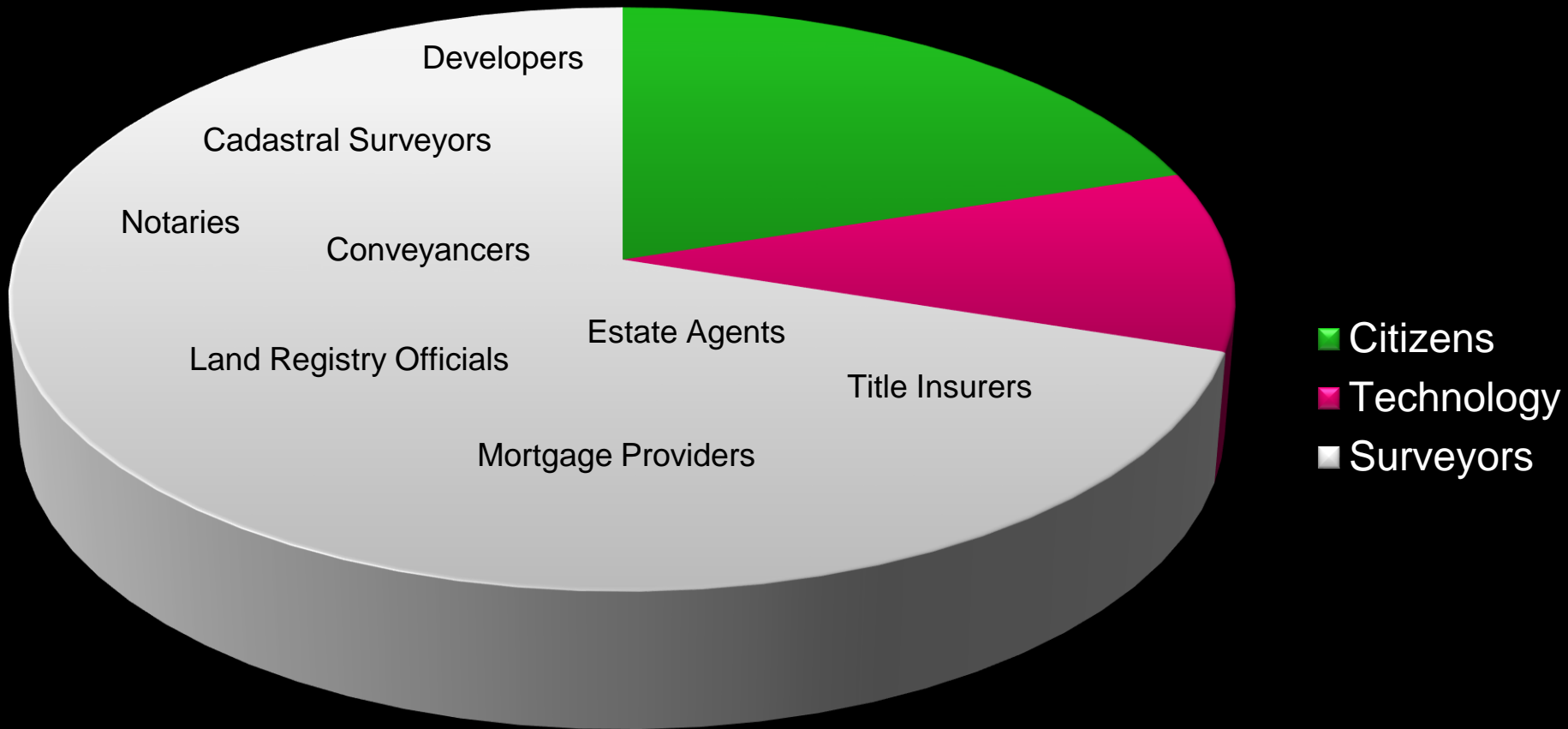


## Distribution is not usually so equal...



In many countries cadastral intelligence is usually **vested in a select few** land professionals

# Individual actors with high levels of cadastral intelligence...



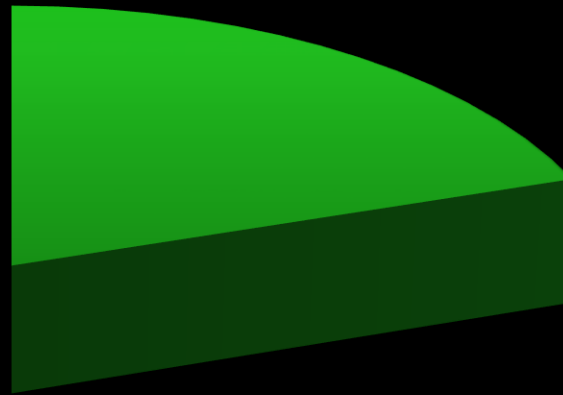
The other holders of cadastral intelligence might be considered **underexploited...**



Is this a **problem**?

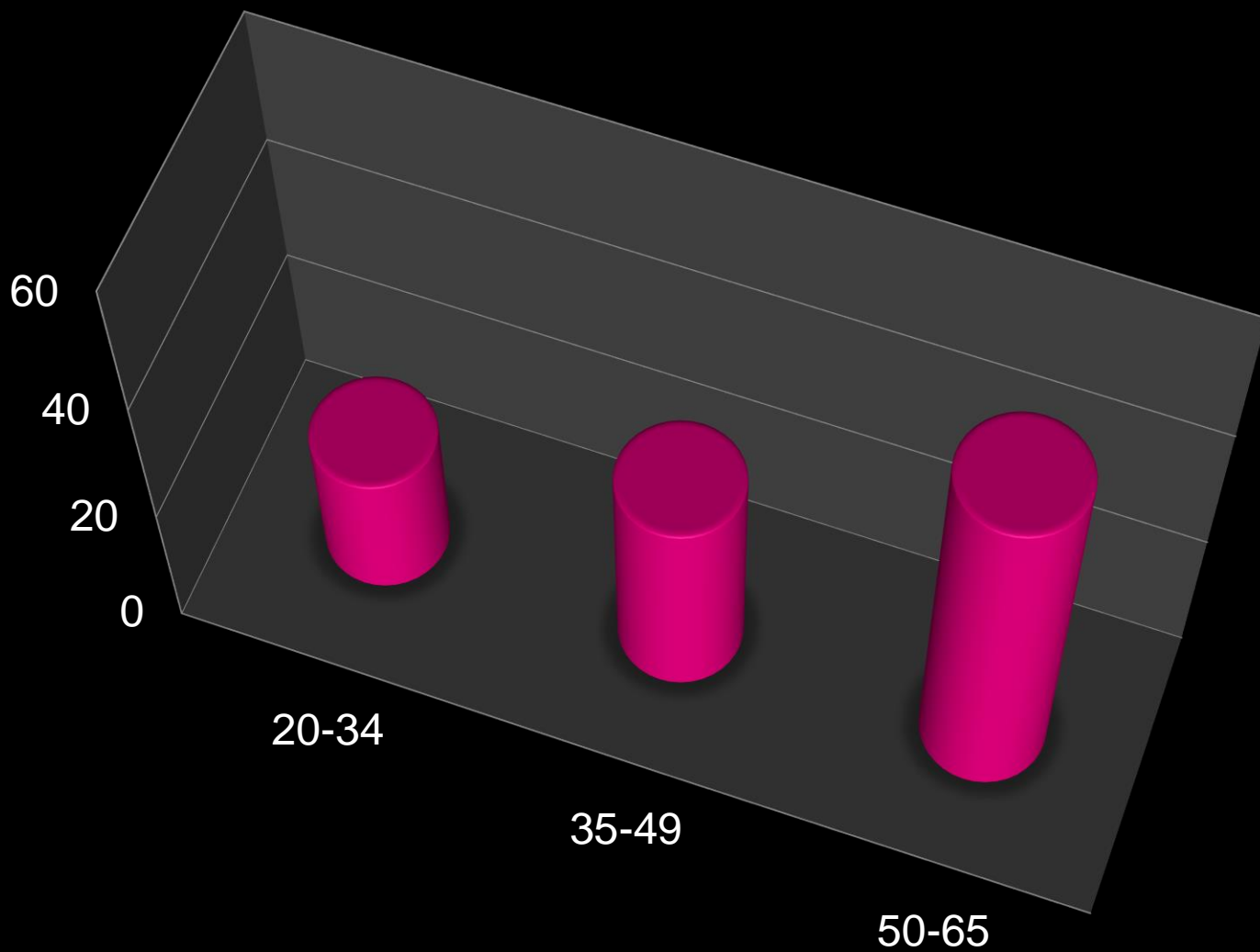


**If your country graph looks anything like this one,  
then yes, it probably is...**



■ Cadastral Intelligence  
Intelligence Gap

**If the age profile of the land profession in your country looks like this, then it could be too...**



**...and if to create one land professional in your country takes this long, it could be a problem too.**

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

18  
Years

300,000 EU worth of training costs (approx)

300K  
EU

We haven't even paid for a day of surveying yet

1K EU/  
day

We haven't even paid for equipment yet

40K  
euro

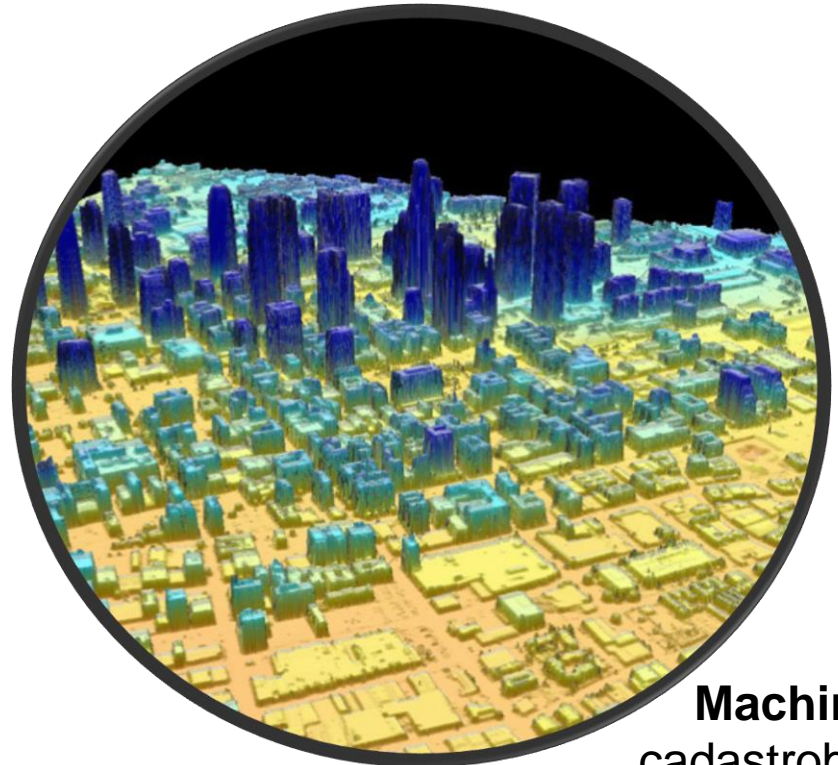


In these cases we should see  
underexploited cadastral  
intelligence as an  
**opportunity...**





**Citizens**  
mandated mobs



**Machines**  
cadastrobots



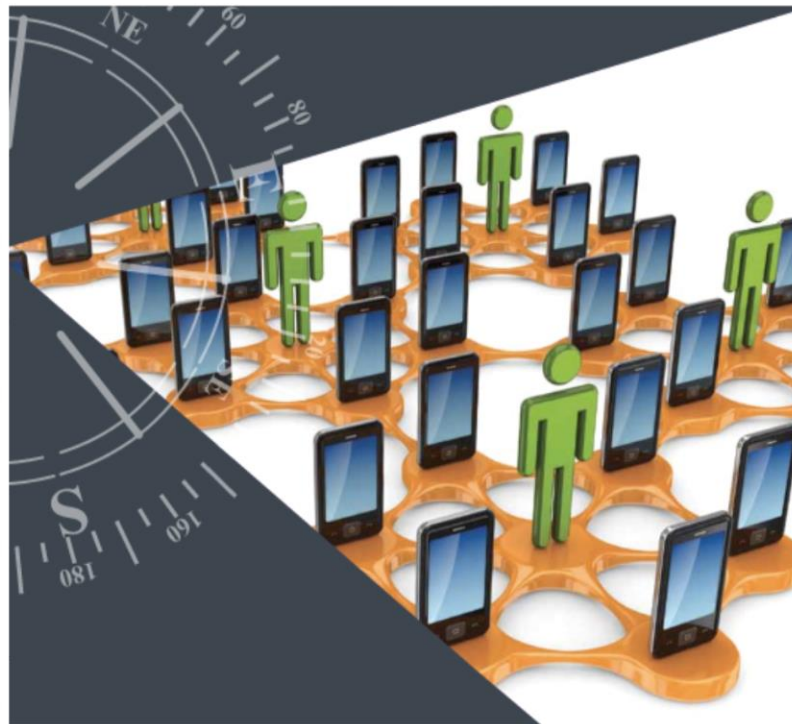
the  
mandated  
mobs

Report November 2011

# RICS RESEARCH

## Crowdsourcing Support of Land Administration

A new, collaborative partnership between  
citizens and land professionals

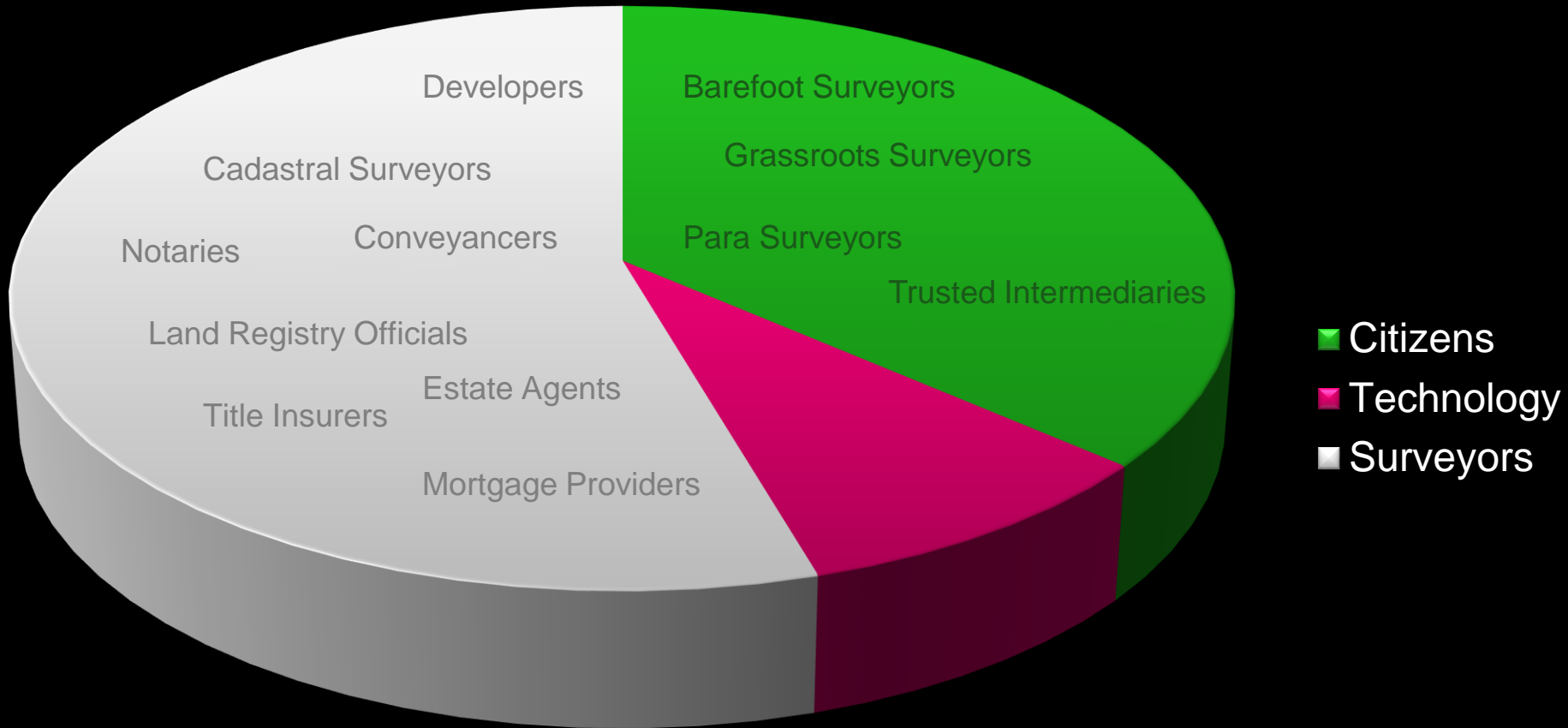


[rics.org/research](http://rics.org/research)



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# Citizens are taking back a bigger piece of the pie



- 1. Sketch mapping** involves community members drawing pictures of their lands and natural resources on a large piece of paper. The exercise can help to create a general understanding of the community's spatial layout and promote discussion of land and natural resources management. However, sketch maps are difficult to use to identify specific locations or distances.
- 2. Satellite imagery mapping** involves using printed, high-resolution photographs of the community's lands taken from satellites. This imagery shows community lands and natural resources in detail and can be used to create maps that are more accurate and useful for calculating distance and area. In this strategy, community members draw maps on top of printed satellite imagery.
- 3. Digital mapping** involves using mapping software to create digital maps of a community's spatial information. In some approaches, the software can be used to project satellite imagery from a computer onto a large screen, where community members can interact with it and identify



## COMMUNITY LAND PROTECTION FACILITATORS GUIDE



**Social Tenure Domain Model**  
A Plugin for QGIS  
Version 1.1



[LEARN MORE](#)

## Social Tenure Domain Model

A pro poor land information tool.

### STDM AS A CONCEPT

There is a gap in the conventional land administration systems such that customary and informal tenure cannot be easily handled. There is a need for complimentary approaches in land administration.





### My Maps

Google Inc. - 20 november 2014  
Productiviteit

Instal

Add to Wishlist

★★★★☆ (52,457)

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Top Developer



### Wolf-GIS

Wolf-Tek - 13 oktober 2014  
Productiviteit

Installeren

Toevoegen aan verlanglijstje

★★★★☆ (47)

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### Mobile Data Collection

GIS Cloud - 2 February 2015  
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Instal

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★★★★☆ (123)

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### Map It - GPS Survey Collector

Andrzej Bieniek - 4 February 2015  
Productiviteit

Instal

Add to Wishlist

Provides in-app purchases

★★★★☆ (23)

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### ArcGIS

Esri - 8 oktober 2013  
Productiviteit

Installeren

Toevoegen aan verlanglijstje

★★★★☆ (2,006)

8+1 +2536 Dit aanbevelen op Google



### SuperSurv M3 Lite - GIS App

Supergeo Technologies Inc. - 14 december 2014  
Tools

Instal

Add to Wishlist

★★★★☆ (10)

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### Point GIS

Atlas-Tech - 26 september 2014  
Productiviteit

Installeren

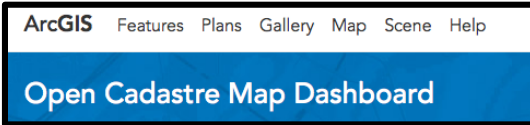
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*BUILDING UAS CAPACITY FOR THE LAND ADMINISTRATION SECTOR*

# From Barefoot to 'Air-foot' Surveyors

JUNE 2015 | GIM INTERNATIONAL | 21

# Three possibilities for the mandated masses...

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

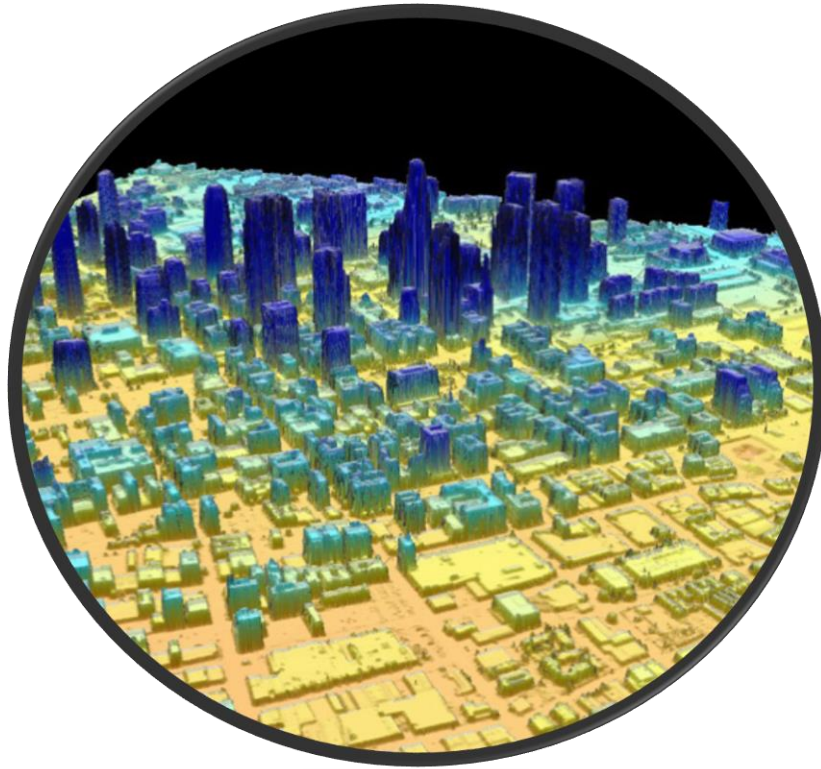


2. **Self Starters:** crowdsourced land recording fills the gaps where formal systems do not exist, or have failed (e.g. customary lands, slums)



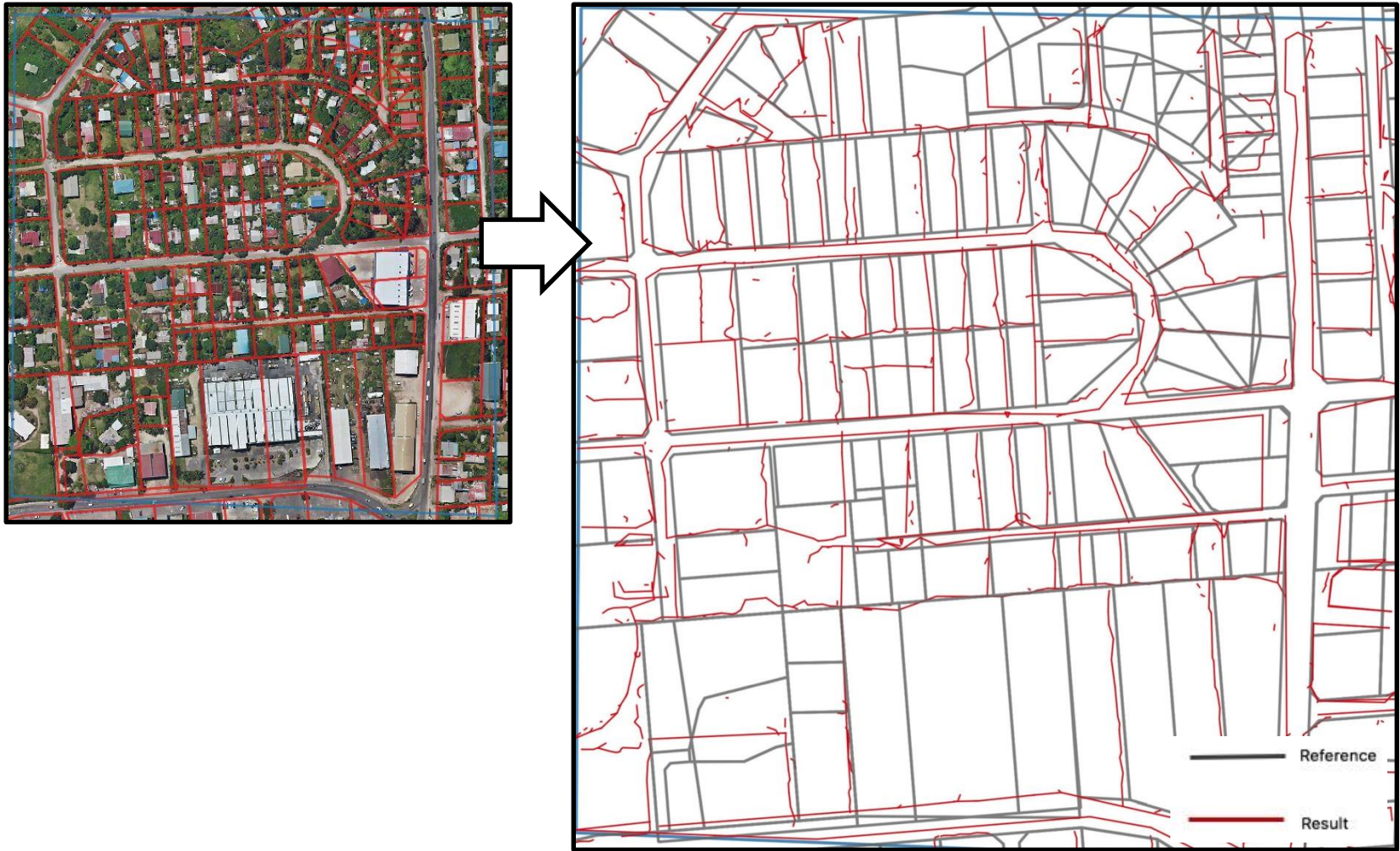
3. **Rebels:** crowdsourced land recording could be used to challenge existing land administration systems (e.g. land grabs, cases of dispute)





# the cadastrorobots





**Courtesy:** X, Luo, (2016), Investigating semi-automated cadastral boundary extraction from airborne laser scanned data, MSc Thesis, ITC, University of Twente, The Netherlands.

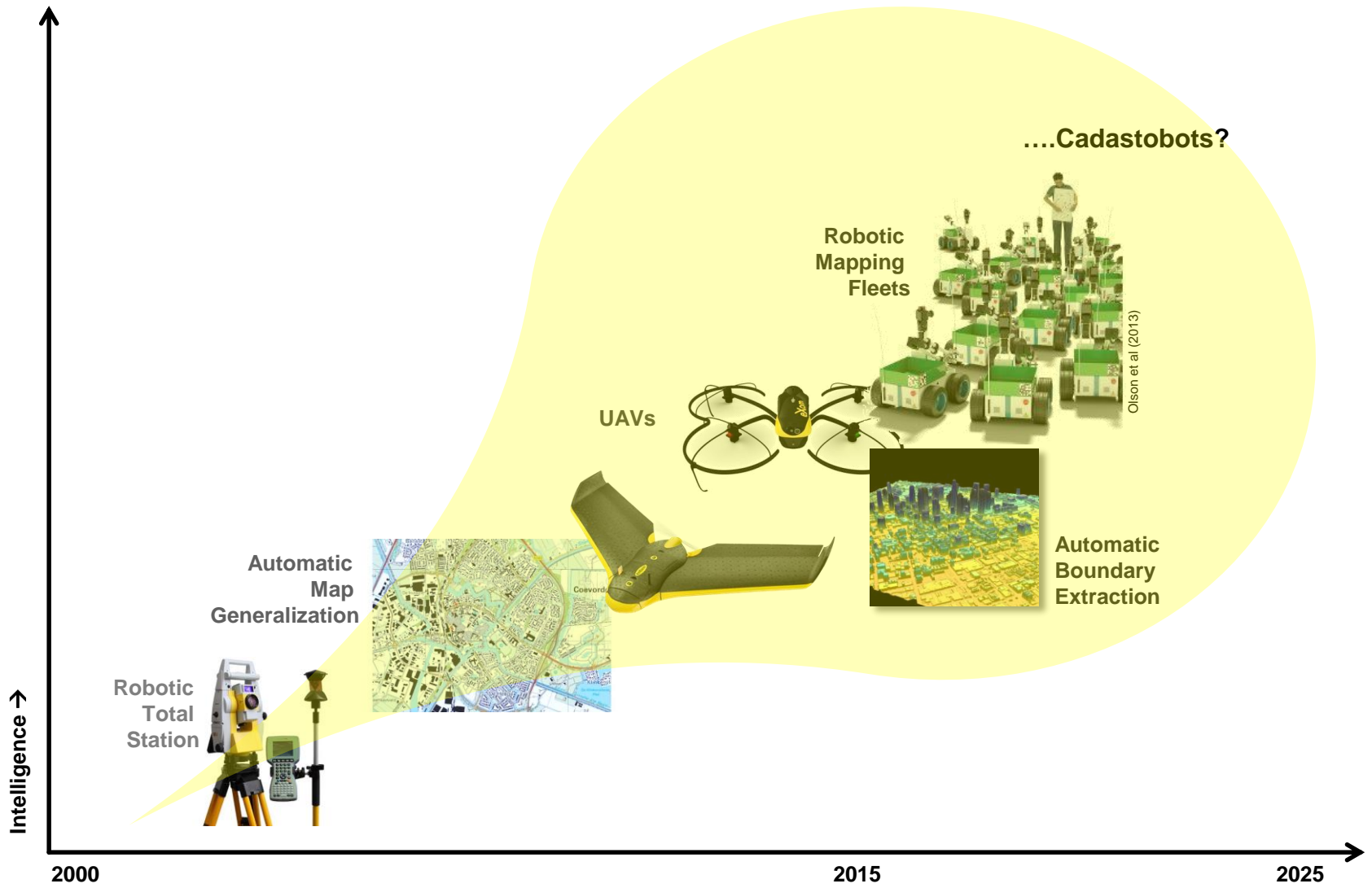


CONSELHO MUNICIPAL DE MAPUTO

EDITAL

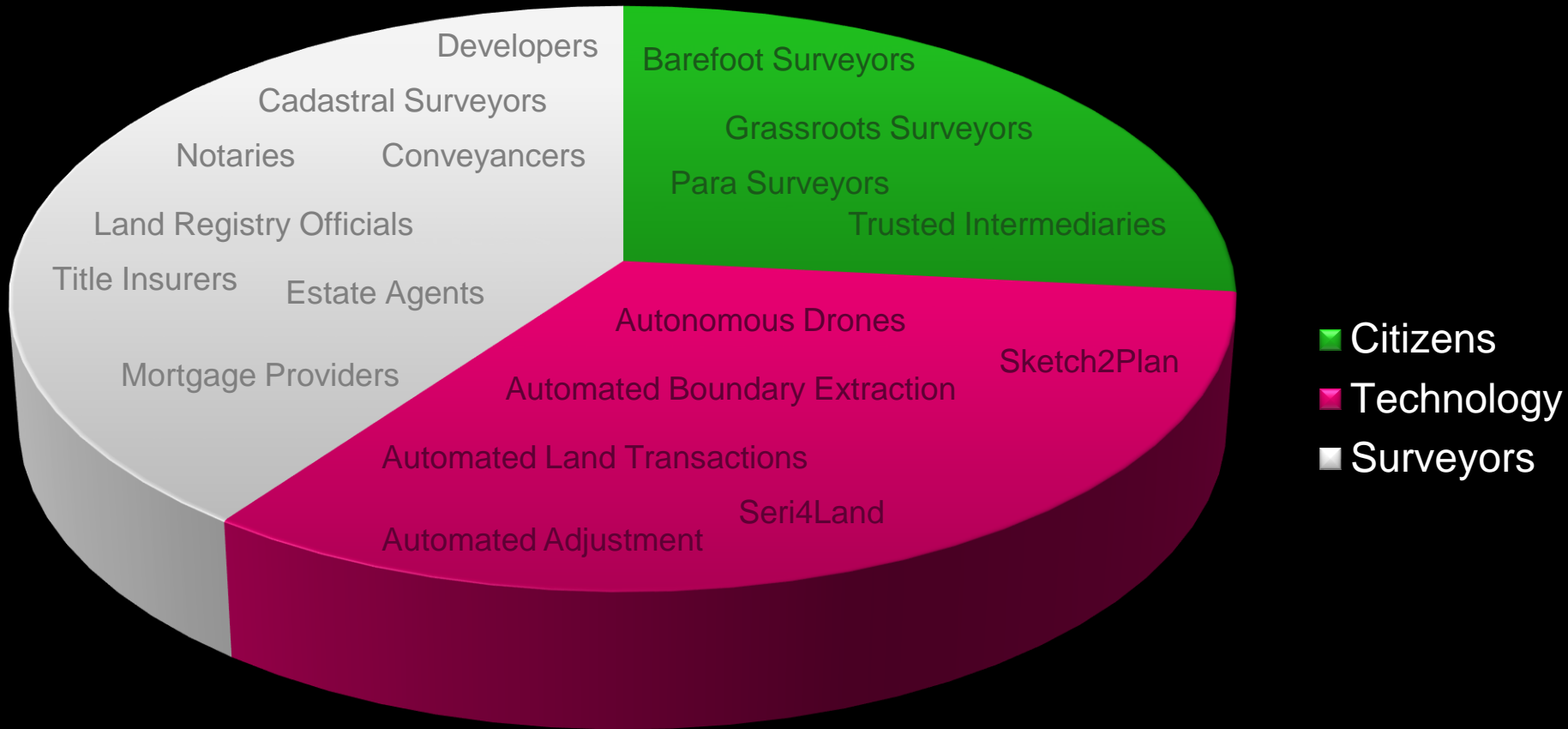


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# How big will the piece of pie be for the cadastrorobots?



*'Kadaster Netherlands reduced  
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**In summary**, thinking about ‘cadastral intelligence’ challenges us to broaden our thinking about ‘who’ and ‘what’ can be a cadastral surveyor.

But...

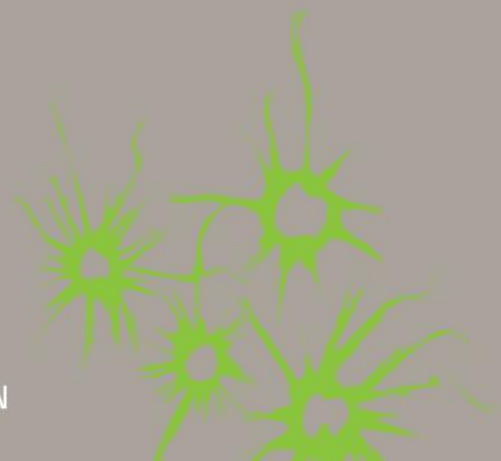
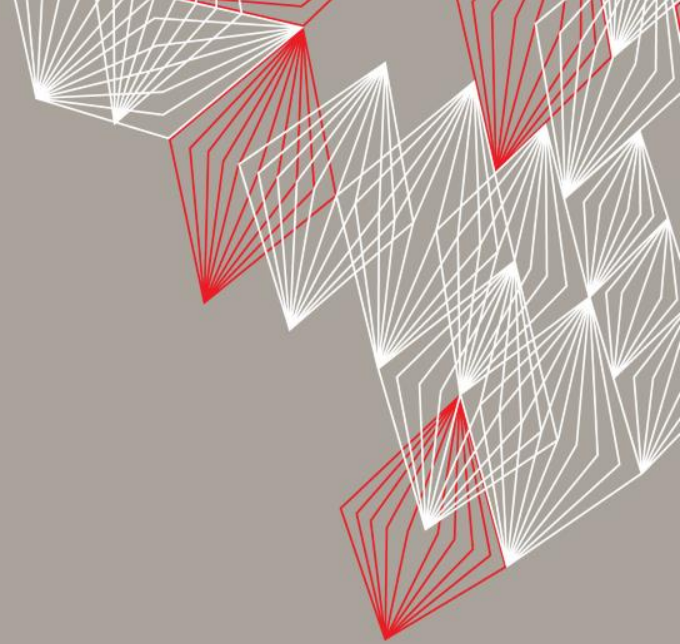
- How can cadastral intelligence actually be measured? What indicators?
  - How much can *or will* citizens do? Is there a line? Where is it?
  - The cadastrorobots are coming. What are the implications for land professionals? How much can *and should* be automated? What can we learn from other industries about how to react (e.g. manufacturing)?

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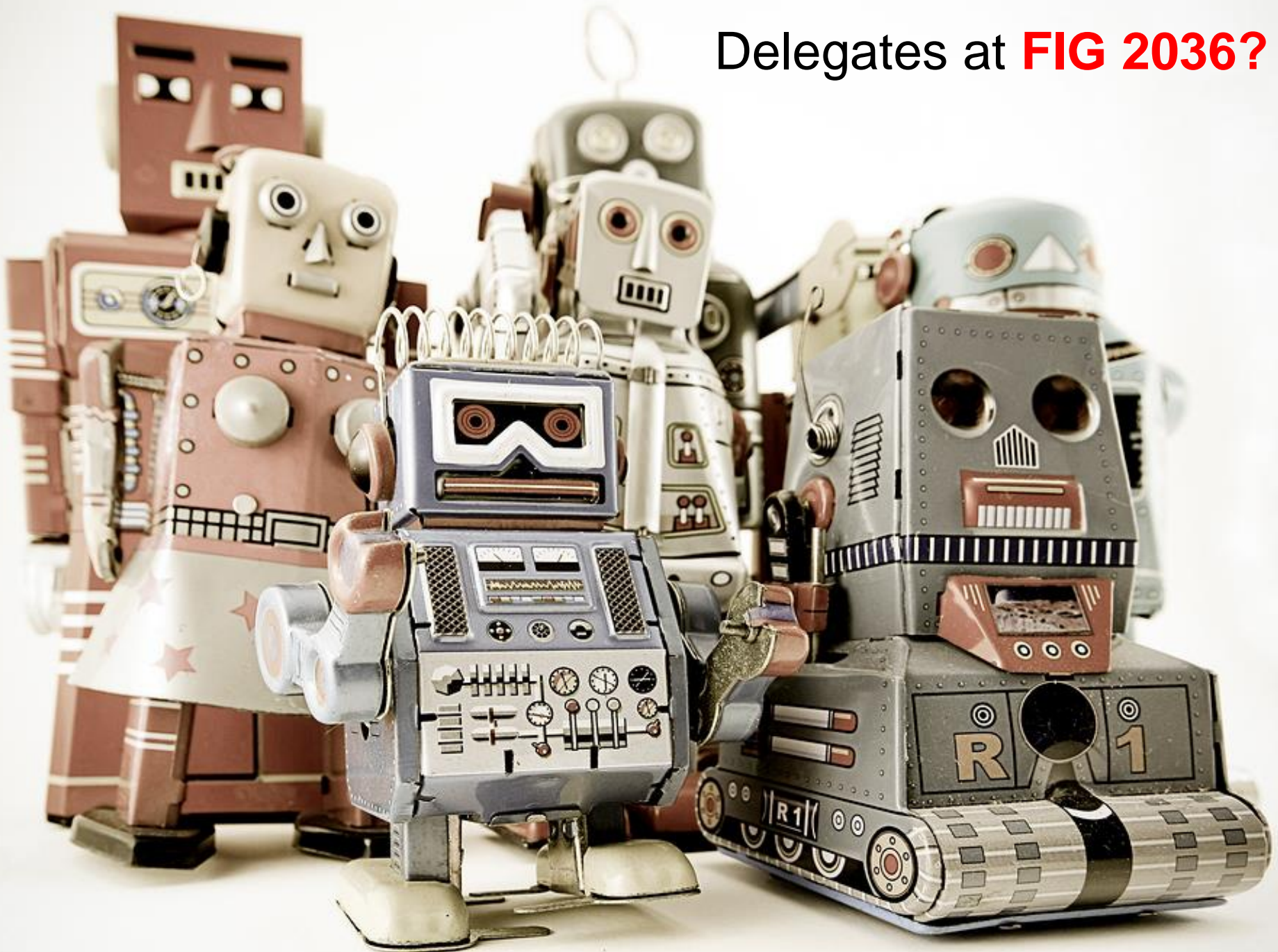
Thanks. Questions. Discussion.



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# Delegates at **FIG 2036?**





**FIG WORKING WEEK 2020**



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