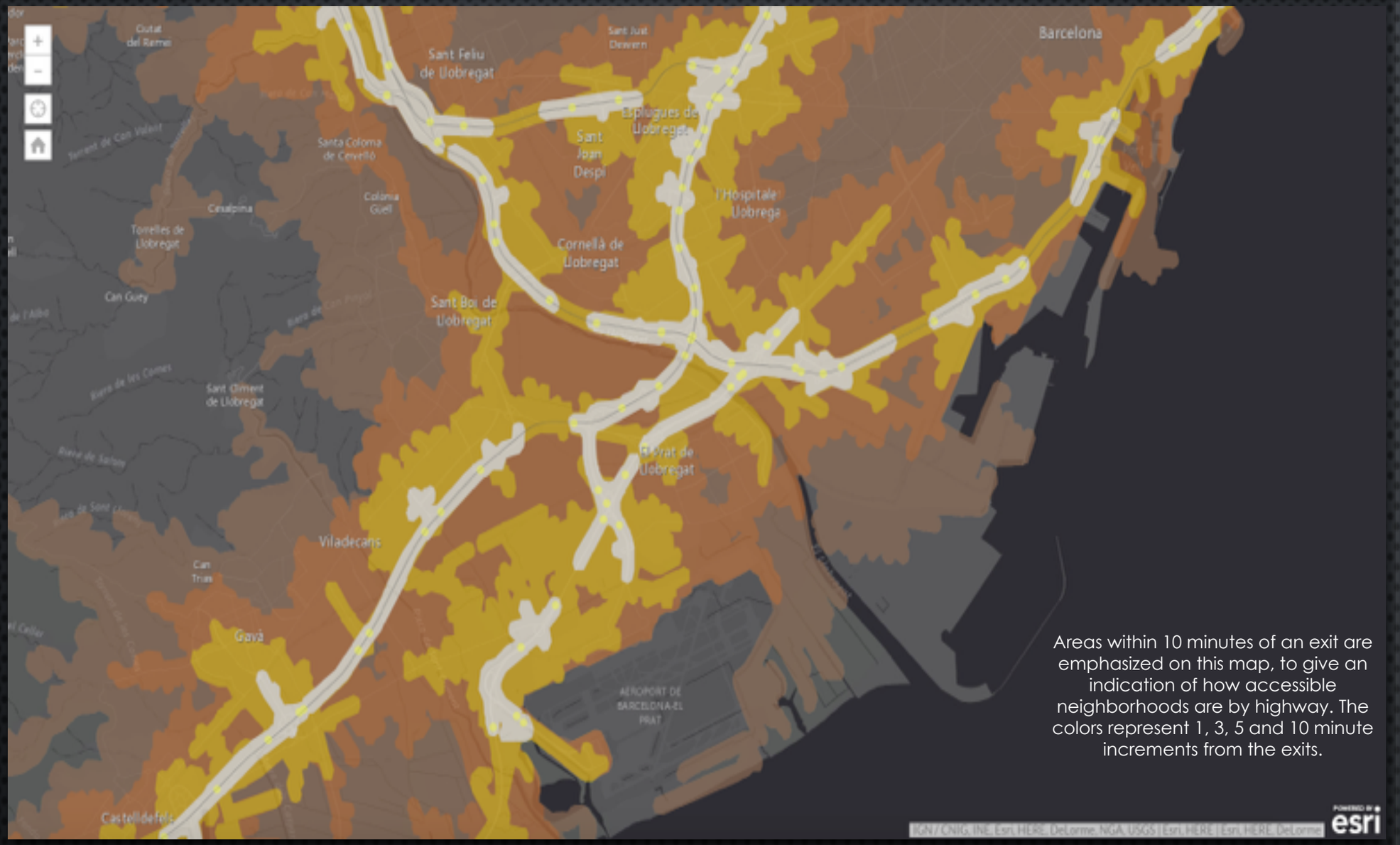

Enhance Security, Safety and Efficiency With Geospatial Visualization

2015 Global Corrections Digital Technology Conference

Fred Roesel, Marquis Software

How Do We Consume Information?

- 90% of information transmitted to the brain is visual, and visuals are processed 60,000X faster in the brain than text.

- Tables, with their rows and columns of data, interact primarily with our verbal system. We read tables.

- Maps interact with our visual system and present an immense amount of information quickly in an easy-to-consume-fashion. It's a high bandwidth information flow from our eyes to comprehension.

Sources: 3M Corporation and Zabisco

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battery seriousness
contraband confinement
patterns housing movement
weapons assessment
drugs
transfer time STG
report
assignment health
PREA
victim predatory
illness assault
incident escape
data
threat unit cell safety
intelligence staff risk
aggressor conflict separation
adseg cameras gangs
escort visitors disicplinary
precautions violent
contaigous

The Challenges Of Identifying Operational Issues

- Having the Data
- Having the Map
- Merging the Two
- Figure Out What You Want to See

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How Geospatial Software Integrates with OMS Data

- GIS software can integrate and interpret data from many different systems and data sources;
  - OMS Data
  - Videos systems
  - GPS location data
- A GIS database connects directly to the OMS and then produces a rich, detailed way of visualizing and interacting with all of this data;
  - GIS directly ingests and displays and supports 100+ data formats
- All of this data is then displayed on basemap consisting of satellite imagery and CAD drawings of the prison facility accurate down to the cell level
- All of the other OMS data is then displayed and interacts on the facility basemap, including;
  - Inmate locations
  - Officer locations
  - Keep separates
  - Gang members
  - Camera locations
  - Incident locations
  - Hot spots of activity

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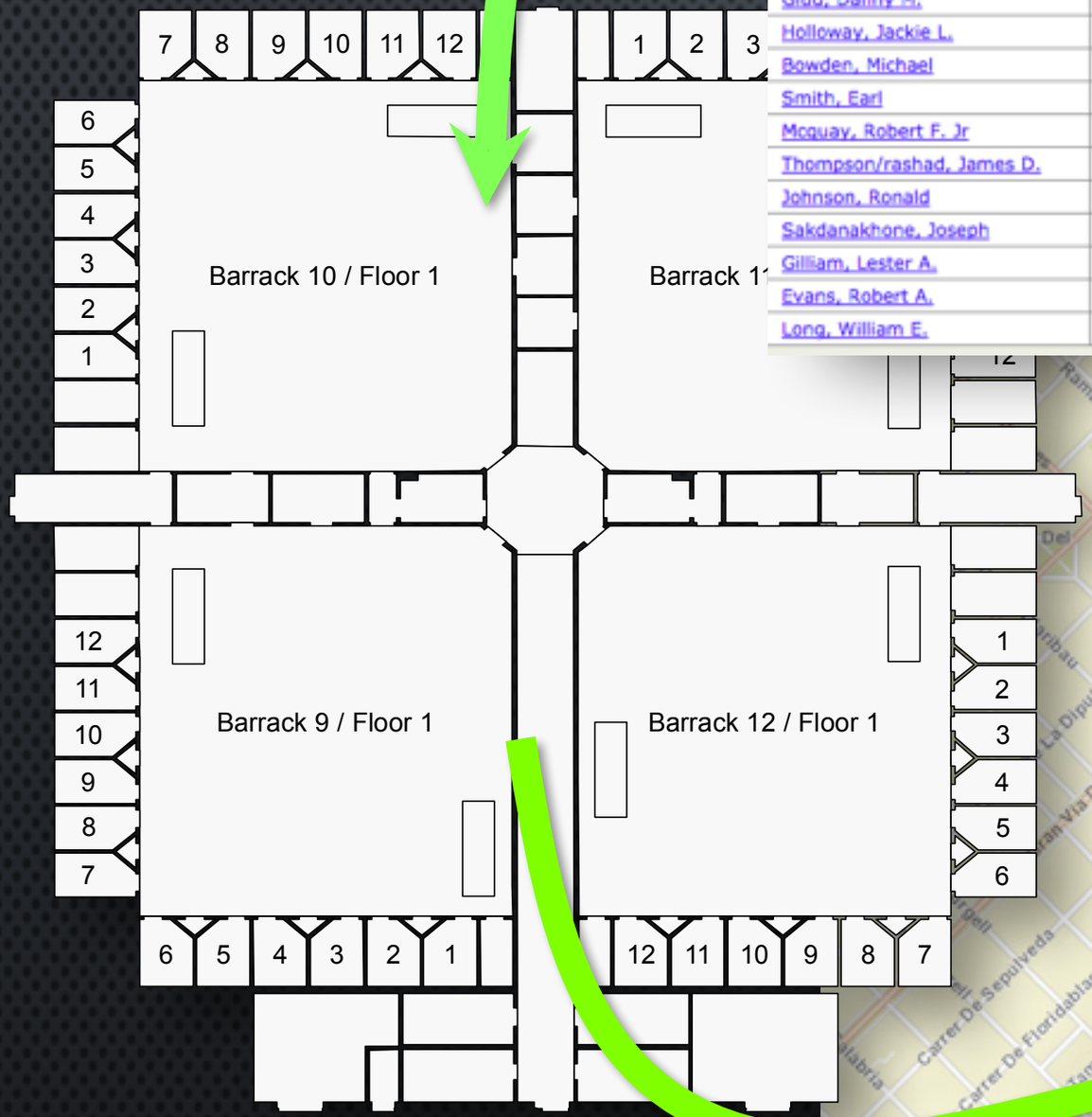
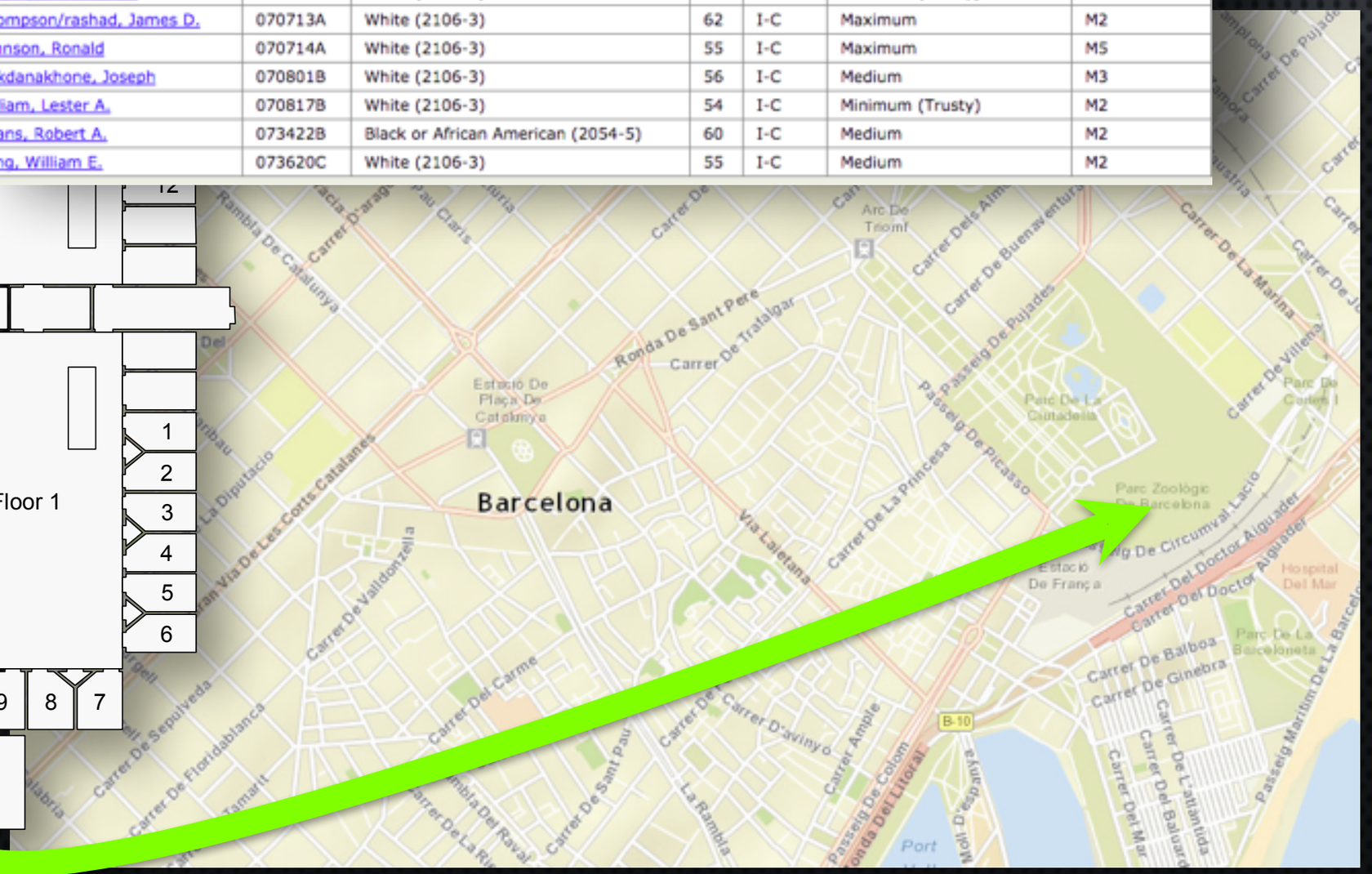
Selected Inmates (1 - 20 of 1678)

Inmate Name	ADC#	Race	Age	GT Class	Custody	Medical Grade
Howard, Joe	000944S	Black or African American (2054-5)	62	I-C	Safekeeper (Death Row)	M3
Calico, Radford	053533B	White (2106-3)	82	I-C	Maximum	M5
Jones, Charles J.	059051C	White (2106-3)	83	I-C	Minimum (Trusty)	M4
Miller, Charles	061821F	Black or African American (2054-5)	77	I-C	Maximum	M3
Scott, William	062159B	Black or African American (2054-5)	82	I-C	Maximum	M3
Godfrey, Floyd L.	062348A	Black or African American (2054-5)	64	I-C	Medium	M3
Stell, Benny J.	063267C	White (2106-3)	68	I-C	Maximum	M4
Upton, Ira	064809A	Black or African American (2054-5)	70	I-C	Maximum	M3
Henderson, Albert	065214A	Hispanic or Latino (2135-2)	63	I-C	Medium	M2
Glud, Danny M.	066298B	White (2106-3)	65	I-C	Medium	M3
Holloway, Jackie L.	067193A	White (2106-3)	66	IV	Maximum	M3
Bowden, Michael	067876C	Black or African American (2054-5)	59	I-C	Medium	M2
Smith, Earl	068635C	White (2106-3)	79	I-C	Maximum	M4
Mcquay, Robert F. Jr	069777H	White (2106-3)	58	I-B	Minimum (Trusty)	M1
Thompson/rashad, James D.	070713A	White (2106-3)	62	I-C	Maximum	M2
Johnson, Ronald	070714A	White (2106-3)	55	I-C	Maximum	M5
Sakdanakhone, Joseph	070801B	White (2106-3)	56	I-C	Medium	M3
Gilliam, Lester A.	070817B	White (2106-3)	54	I-C	Minimum (Trusty)	M2
Evans, Robert A.	073422B	Black or African American (2054-5)	60	I-C	Medium	M2
Long, William E.	073620C	White (2106-3)	55	I-C	Medium	M2





Visualize - Lay Your Offender Data On a Map

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The Benefits of Geospatially Mapping OMS Data

- GIS uses powerful visualization tools to understand data that would otherwise only be seen in a report;
  - Inmate locations and movement can be tracked on the map;
  - Historic incidents data can be visualized to identify problem areas and understand the problem
  - Camera view sheds can be analyzed to identify risk areas and blind spots
  - Keep separates and rival gang members can be monitored visually to insure that they do not interact
  - The facility can be managed through an interactive map that shows;
    - Unit populations, open beds, out of service cells,
    - Maintenance and logistics for facility management (equipment maintenance, repair task orders)
- In community corrections;
  - Offenders can be monitored in real-time
  - Geofences can be built around prohibited areas that will alert personnel if an offender has entered
  - GIS can be used to verify if a home address is correct and if it is a viable residence
  - Smarter caseload management allows cases to be assigned to staff based on geography and routing to home visits
  - Offender's movements can be tracked and compared to crime and other data for possible probation violations
  - Mobile interoperability allows maps to be used in the field and allow data collected to be shared in real-time

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The Challenges of Achieving GIS Mapping

- The biggest challenges to GIS mapping starts with having good data
  - The data displayed on the map is only as accurate as the source data
    - Challenges can include;
      - Poor data entry
      - Inaccurate location information
      - Clerical errors
  - Getting good accurate facility maps can also be a challenge, especially with older facilities
    - A GIS can work with what it is given
    - Older, or non-existent CAD drawings just mean more work on the front end to build the basemap through digitization of old blueprints, etc.
    - Once the facility map is built, an addressing geodatabase must be built so that inmates can be mapped to their addresses (their cell and bed locations).
- Connecting all of the OMS and other data systems can be a big challenge as the connections can be created easily
  - The challenge is achieving the automation of these data feeds and geoprocessing tasks so that the map is kept up to date with the most accurate and timely data
- Once the GIS map has been built, it needs to be kept up to date and maintained to maintain its relevance to agency missions

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The Steps to Achieve GIS Mapping

- It is very easy to get started mapping data at the basic level
  - Web maps have now evolved to the point where almost any data set can be dragged and dropped and it will be mapped and ready for some basic geospatial analysis.
- But to create a true GIS it is a little more complicated;
  - Acquisition of hardware and software and access to a good OMS database
  - Creation of a facility basemap
  - Creation of a geodatabase of all the facility layers
  - Connecting and projecting OMS and other datasets to the basemap
  - Automating of geo-processing tasks that display points on the map, color-coding and symbolizing these points, creating hot spots of activity, and finding spatial relationships between the various datasets

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Real Time Versus Some Time

Arkansas Department of Corrections

Ouachita River Correctional Unit – High Security

- Intake Center
- Hospital Unit
- Administrative Segregation Unit
- General Population
- Capacity of 1,600

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Arkansas Department of Community Corrections

Offenders Supervised in the Community:

- Supervision of Parole and Probation
- Home Supervised Caseloads, Residential Services & Residential Treatment
- Eighty-five offices, units, etc.
- 36,000 Offenders

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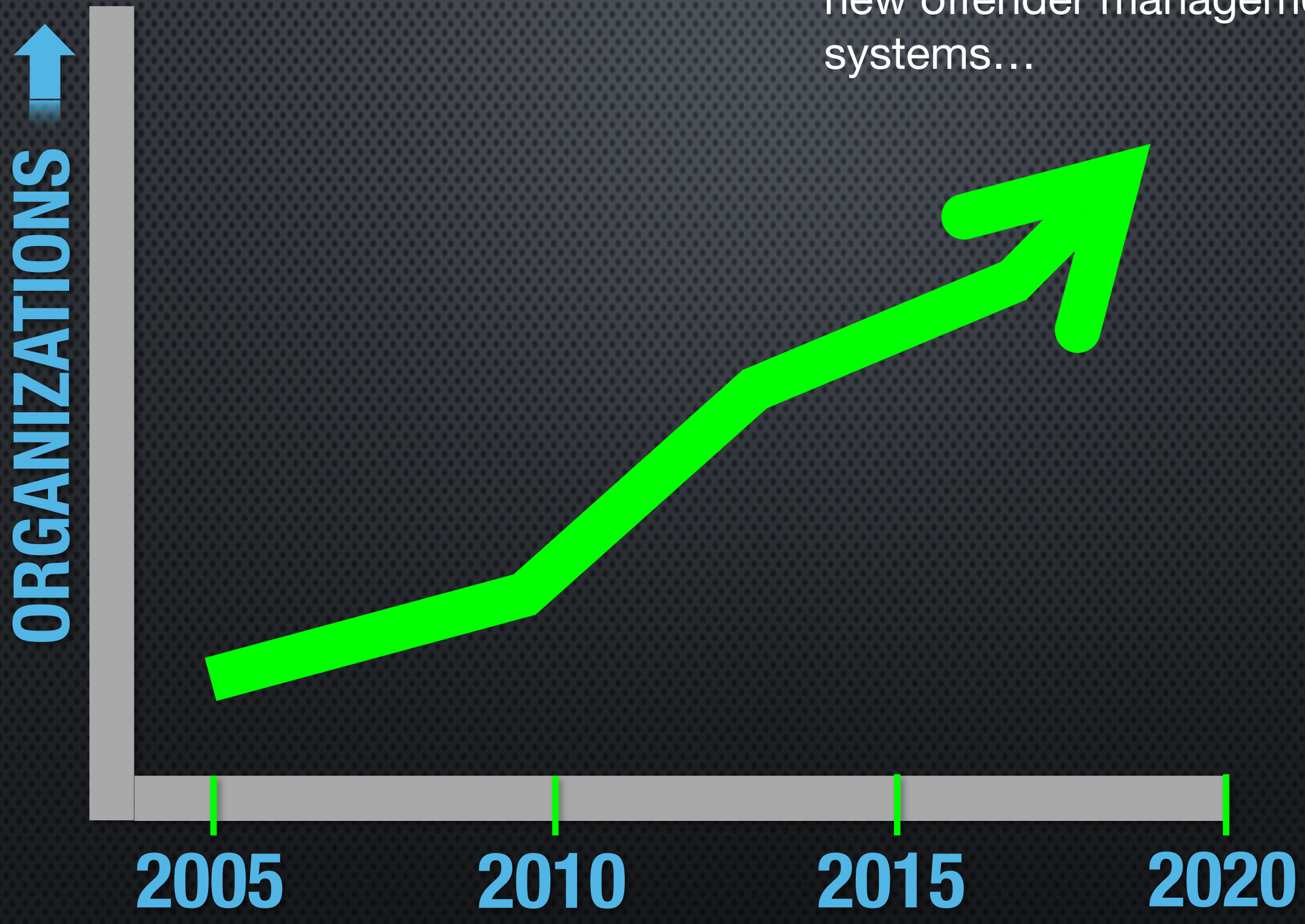
Big data is an evolving term that describes any voluminous amount of structured, semi-structured and unstructured data that has the potential to be mined for information.

Big Data is a powerful discovery tool…to glean new insights. Oftentimes, it's data visualization that allows Big Data to unleash its true impact.

Big Data. (2014, July). In TechTarget. Retrieved 19:20, April 21, 2015, from http://searchcloudcomputing.techtarget.com/definition/Big-Data

Prison and probation organizations are steadily upgrading or moving to new offender management systems…



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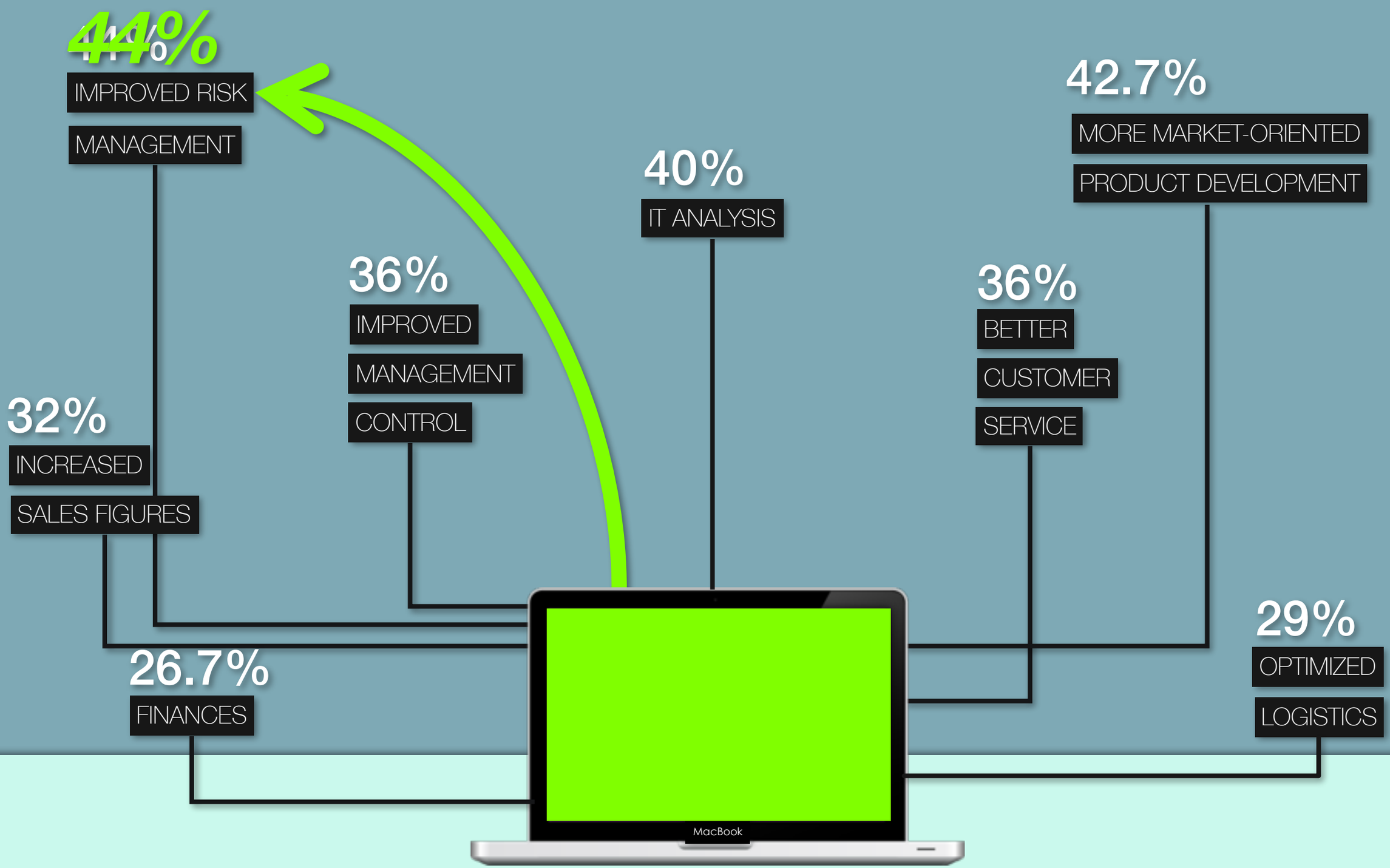
WHICH APPLICATION SCENARIOS WILL BIG DATA SOLUTIONS BE USED FOR IN THE FUTURE?



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OPPORTUNITY!

Geospatial Visualization

Geovisualization or Geovisualisation, short for Geographic Visualization, refers to a set tools and techniques supporting geospatial data analysis through the use of interactive visualization.

A geographic information system (GIS) lets us visualize, question, analyze, and interpret data to understand relationships, patterns, and trends.

Extensively used in:

- Disaster management
- Forestry
- Archaeology
- Environmental studies
- Urban Planning

Geovisualization. (2014, July 20). In Wikipedia, The Free Encyclopedia. Retrieved 20:07, April 17, 2015, from http://en.wikipedia.org/w/index.php?title=Geovisualization&oldid=617692103

What is a Data Visualization Map?

- A data visualization map generally provides a way to correlate information, identify patterns and trends, and find anomalies without manually sorting through numbers…

- Maps are used in big data visualizations because:
  (a) they provide immediate context to the data; and
  (b) maps are typically scalable, allowing the user to zoom in, out or pan to specific areas of interest.

Sources: 3M Corporation and Zabisco