VISUAL ANALYSIS OF LARGE, DYNAMIC DATA - USE CASES, DATA INTEGRATION, USER EXPERIENCE

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LUCIAD

We build **software components** that allow third parties to create **geospatial situational awareness & visual analytics** applications.
SITUATIONAL AWARENESS

→ Situational Awareness (SA) involves being aware of what is happening in the vicinity to understand how information, events, and one's own actions will impact goals and objectives, both immediately and in the near future. [Wikipedia]

VISUAL ANALYTICS

→ Visual analytics is the science of analytical reasoning facilitated by interactive visual interfaces. [DHS]
EXAMPLE – PEOPLE FLOW ANALYSIS
INTEGRATION CHALLENGES

→ Data Integration

→ System integration

→ User Integration
DATA INTEGRATION CHALLENGES

Google Earth Enterprise
- End-of-life
- Large imagery globes in use
- High performance 3D client + strong KML support
- Tech replacement

Integration options
- Read GEE globes directly
- Process new data into tile pyramids
- Generate tiles on the fly from source data
  - Only 1% of tiles actually being looked at...
  - Faster updates of data possible
- Open standards (OGC, …)
DATA INTEGRATION CHALLENGES

→ Real-time video data
  - UAV missions (XTEK, Boeing, Airbus, …)
  - Live video
  - In the field
  - Context data needed

→ Integration solution
  - Standards
    - Standards (STANAG 4609)
    - Combine COTS (H264, …)
  - Performance
    - Direct ingest of video
    - Stream to GPU
    - GPU-based video orthorectification to combine with other geo data and terrain
SYSTEM INTEGRATION CHALLENGES

→ Finnish Defense Forces
  - Multiple systems
  - Core + Addons
  - Multiple SIs
  - Multiple Luciad product versions in use

→ Integration solution
  - Stable Component APIs
  - Binary backwards compatibility
  - Standards compliant
SYSTEM INTEGRATION CHALLENGES

Systematic Frontline
- Full application on mem-stick
  - Mission planning, terrain analysis, defense data formats, ...
  - Mission execution in vehicle
  - Switch vehicles

Integration solution
- Same product as people movement app to have all functionality
- Small footprint
  - Modular components
  - Shrink code base
  - Tune caching strategies
USER INTEGRATION CHALLENGES

→ NATO LogFS
  ▪ Users don’t have time
  ▪ Users don’t have patience (Digital generation)
  ▪ Multiple applications
  ▪ Browser solution

→ Solution approach
  ▪ Simple
    • NATO Style guide
    • Common L&F across applications
  ▪ Interactive at all times
    • Asynchronous
    • High performance
    • Fast data architecture (caching, …)
USER INTEGRATION CHALLENGES

→ Visual analytics
  - Time!
  - Interactive analysis
  - Large data backends

→ Solution approach
  - Connected views (time, 3D, …)
  - Distributed filtering/aggregation
    - on GPU
    - in-memory (CPU)
    - on server
    - on big data back-end
VISION ON INTEGRATION

→ The Death of ETL

→ Components first, standards first as well

→ Time is the most important dimension of geospatial data

→ GPU becomes part of architecture

→ Simple, beau et efficace
THANK YOU!