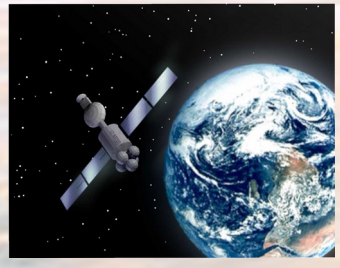
Link: Disaster Management & Global Health

UNOOSA: Working Group Space and Global Health

Tailored Spatial Risk and Resource Management



Prof. Dr. Engelbert Niehaus

University Koblenz-Landau

Introduction

University Koblenz-Landau
Prof. Dr. Engelbert Niehaus

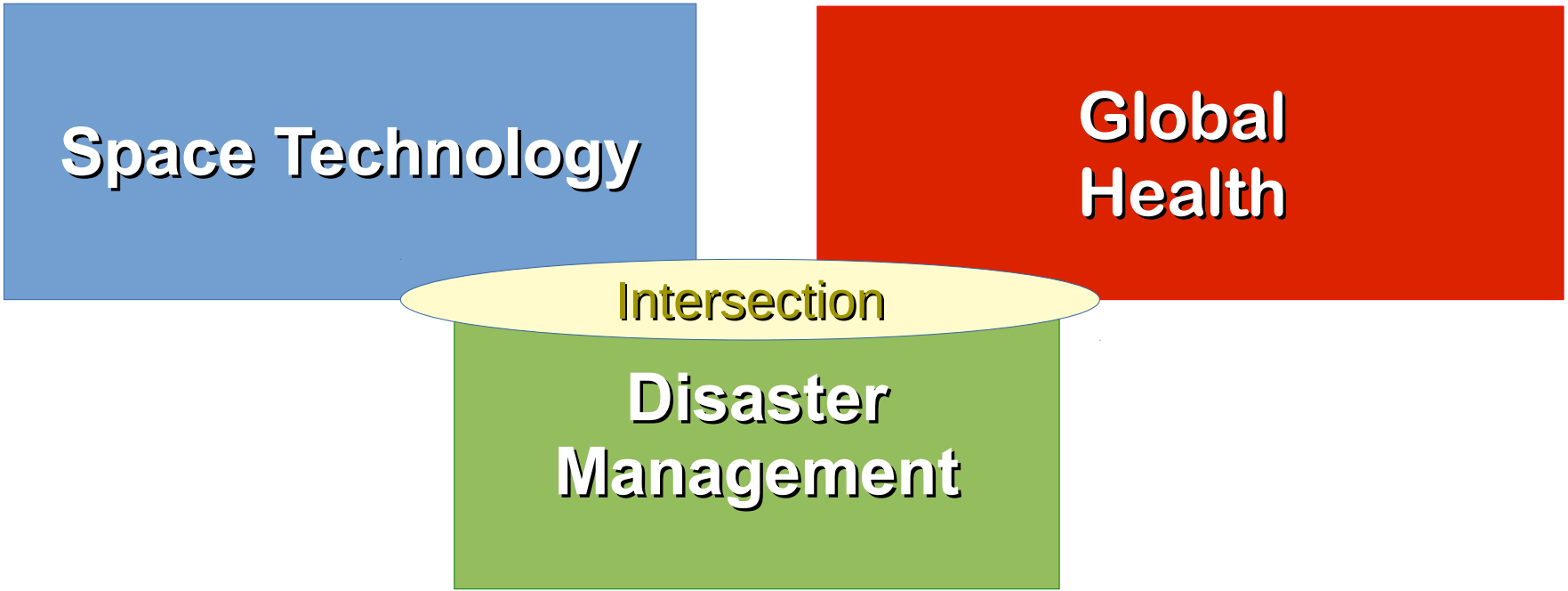
Working Group –
Space & Global Health
Scientific and Technical Subcommittee

Mobile Computing
Mobile Devices as Decision Support Clients
Capacity Building

Mathematical Modelling
Spatial Decision Support
& Risk Resource

https://niehausbert.gitlab.io/audioslides4web/unspider2020

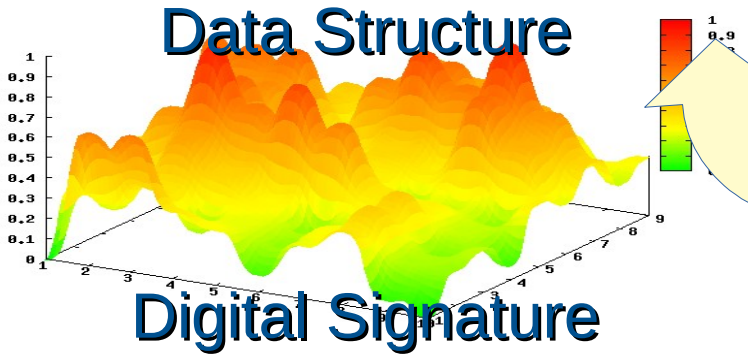
Intersection: Disaster Management, Health & Space



Intersection: Disaster Management, Health & Space

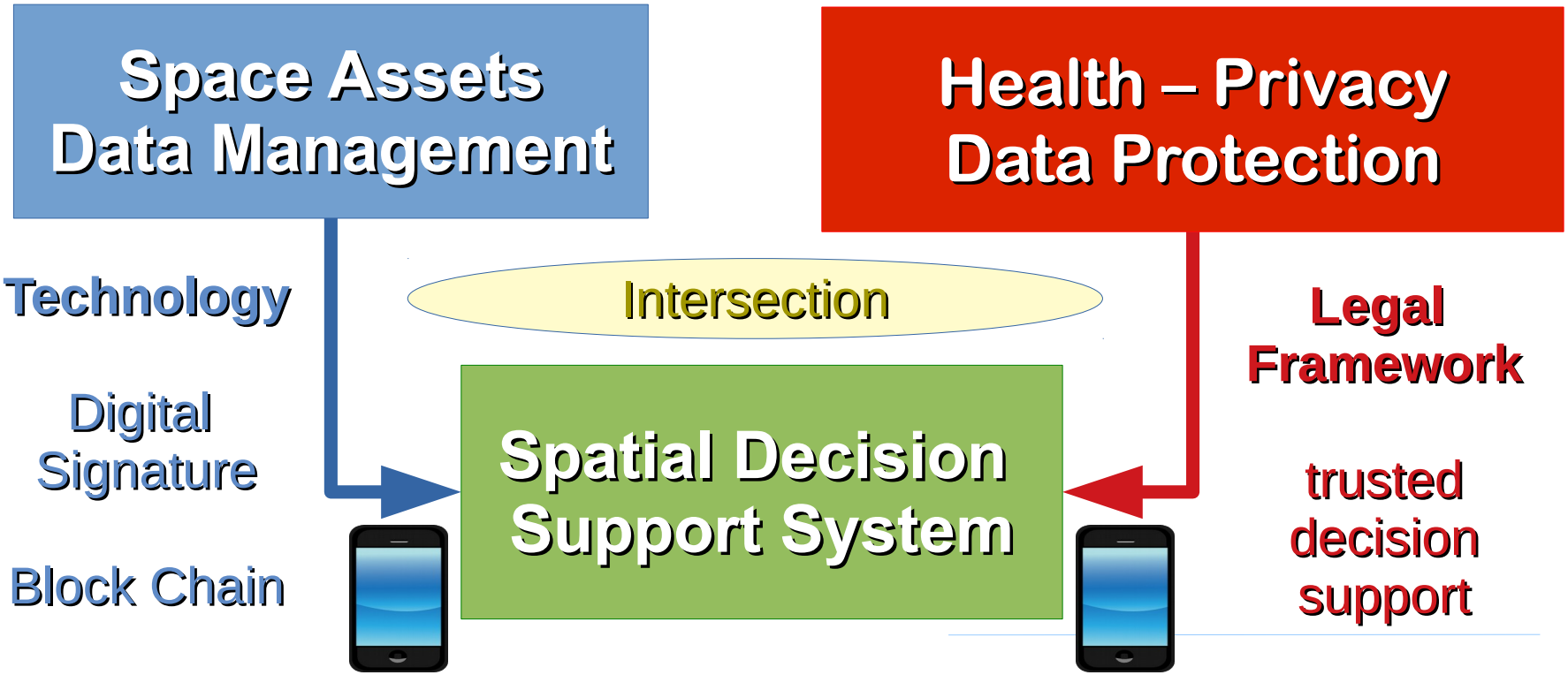
UN-SPIDER Regional Support Office

Spatial Decision Support Global Health

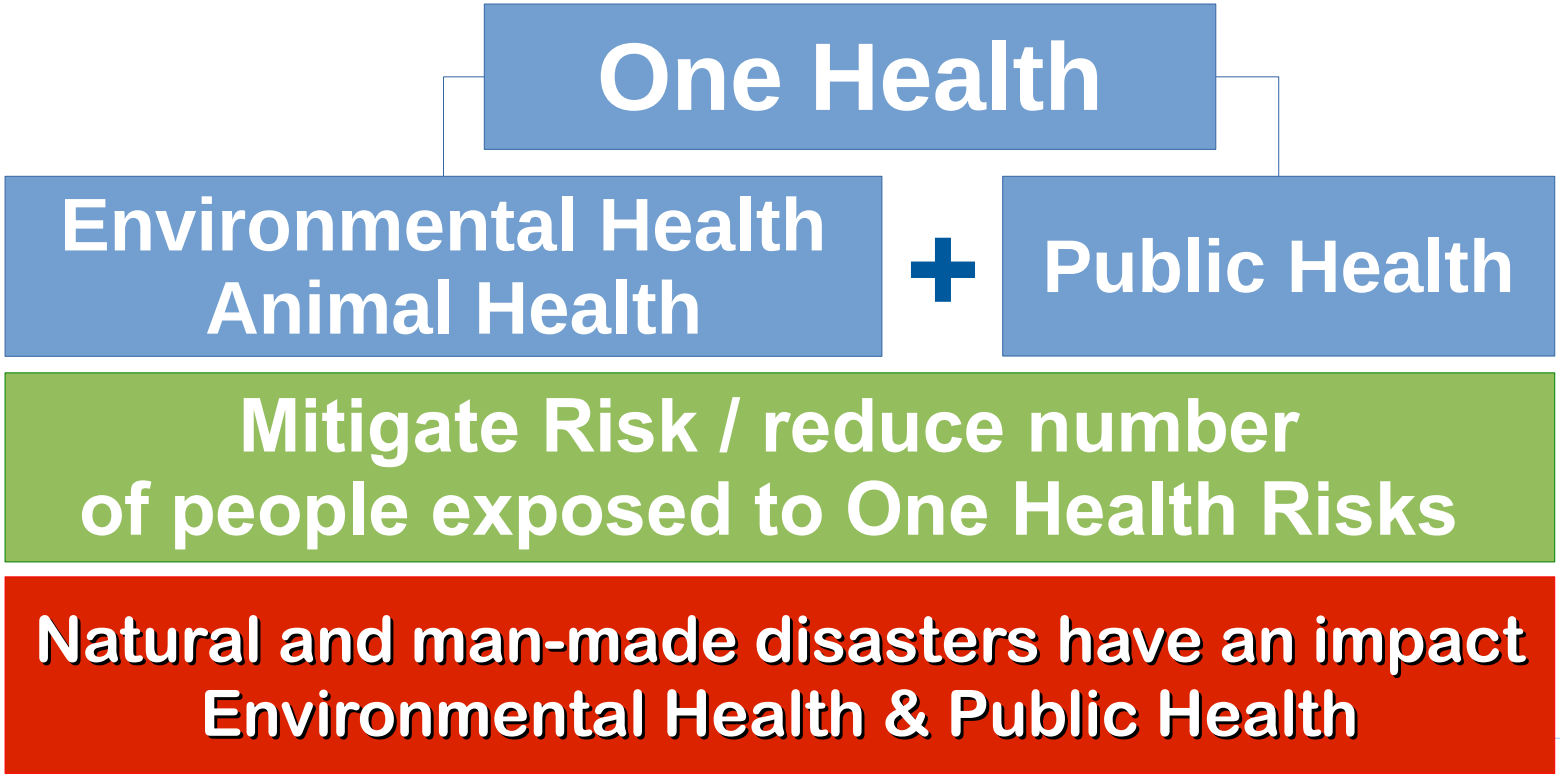


Disaster Management

Health and Space

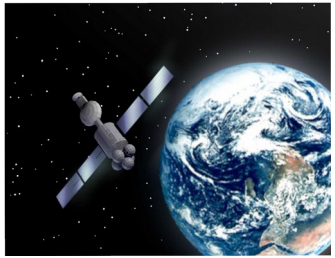


One Health


One Health
Environmental Health
Animal Health
+
Public Health
Mitigate Risk / reduce number
of people exposed to One Health Risks
Natural and man-made disasters have an impact
Environmental Health & Public Health

Reach People – One Health Impact – Risk Mitigation

Space



One Health

"Bridge" from Space to (One) Health Impact

Main Pillars:

Space Technology & Global Health

- **Earth Observation**
- **Satellite Navigation**
  - Routing & Tracking of Resources
- **Communication Telemedicine**
  - Lab-on-a-Chip
  - Ambient Assisted Living

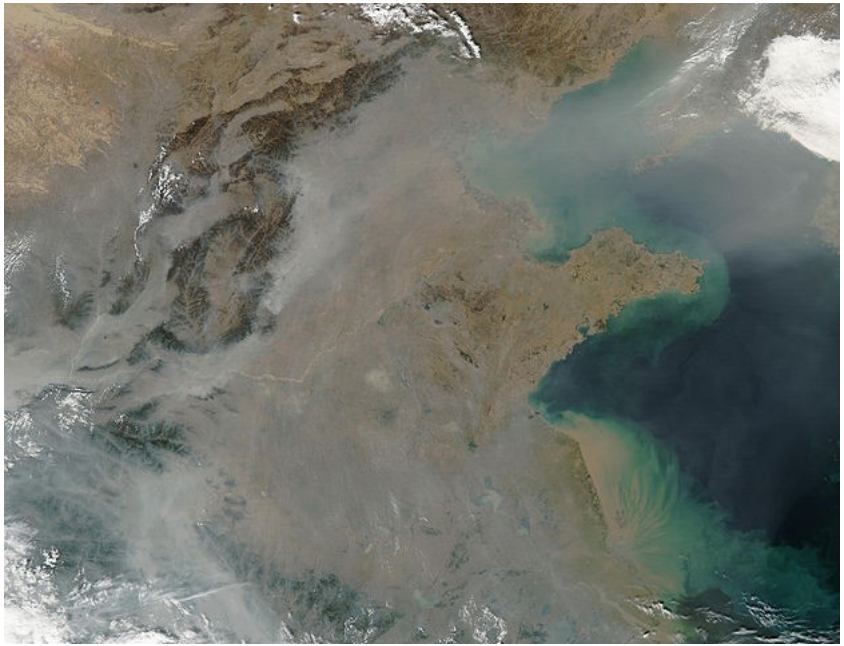
Remote Sensing – Respiratory Diseases

Air Pollution – Respiratory Disease

- combine remote sensing – ground data
- provide decision support for citizens
- urban areas
- trigger risk mitigation strategies

One Health Risk

> respiratory diseases
> public health agency warning
> self protection
> long-term risk mitigation



Source: https://commons.wikimedia.org/wiki/File:Pollution_over_east_China.jpg
License: Public Domain **Description:** Pollution over east China
Author: NASA **Date:** 2007-03-16 (upload)

Remote Sensing – Respiratory Diseases

Bush Fire – Disaster Management

- combine remote sensing – ground data
- provide decision support for citizens
- coordinated fire fighting & evacuation
- planing risk mitigation strategies

One Health Risk

> protection of citizens (fire, air, ...)
> Disaster Emergency Mgmt Agencies
> Wild life, loss of forrest, agriculture
> climate change
long-term risk mitigation

Source: https://en.wikipedia.org/wiki/Anthropogenic_hazard#/media/File:Zaca3.jpg
License: Public Domain **Description:** Active flame front of the Zaca Fire
Author: John Newman **Date:** August 31, 2007

Remote Sensing - Harmful Algae Bloom

Red Tide (Harmful Algae Bloom – HAB)

- caused by algae, *"Karenia brevis"*
- needs major nutrient source
- in costal region
- wind and current aggregates algae

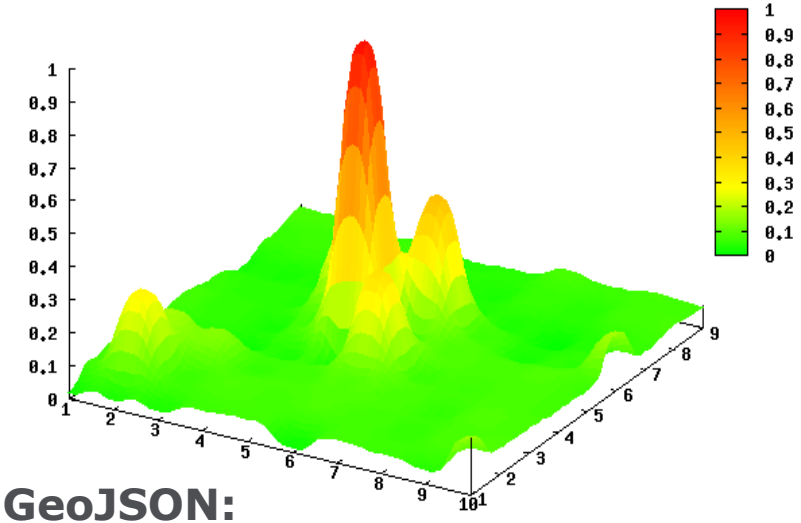
One Health Risk

> respiratory irritation (airbourne toxin)
> skin irritation (exposure)
> make shellfish poissonous
> kills fish, dolphins, ...

Source: https://commons.wikimedia.org/wiki/File:Mar%C3%A9_vermelha.JPG
License: GNU Free Documentation Licesnse **Description:** Red Tide
Author (WikiMedia Commons): objetivo **Date:** 10 December 2007 (upload)

Algal Bloom – Remote Sensing

Decision Support Layer in GIS



GeoJSON:

Assign values to points in a grid

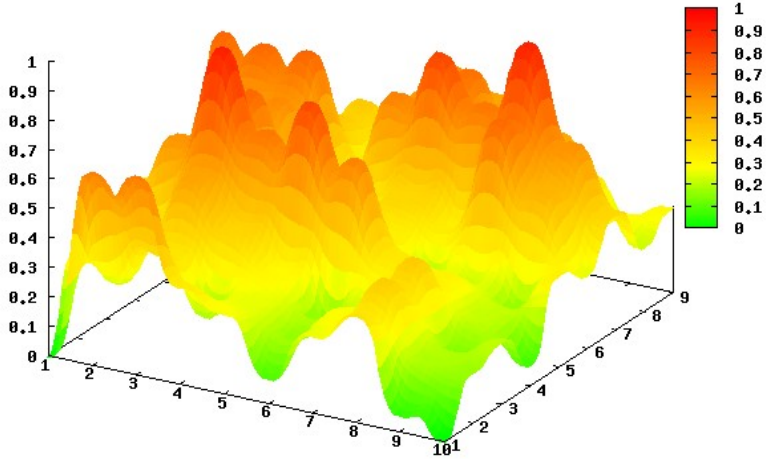
Digital Signature for data product

Source: https://de.wikipedia.org/wiki/Algenbl%C3%BCte#/media/File:Algal_bloom_20040615.jpg
Description: MODIS Rapid Response Team, NASA/GSFC - Sensor: Aqua/MODI
Author: Jacques Descloitres **Date:** June 15, 2004

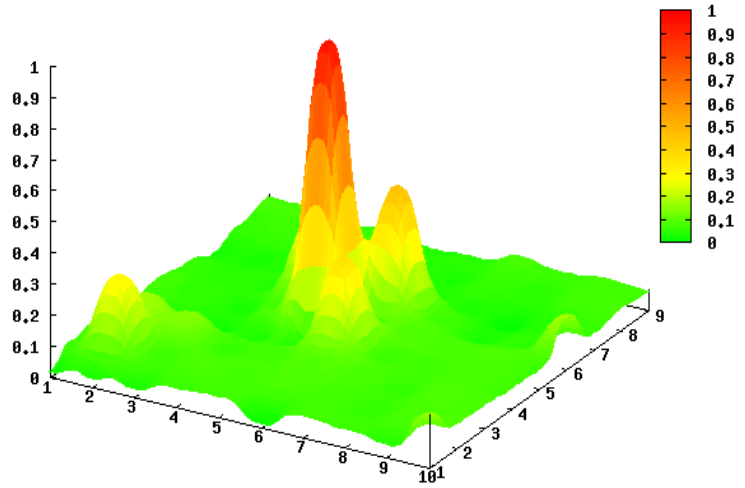
see also https://en.wikiversity.org/wiki/Spatial_Decision_Support_Layers

Spatial Fuzzy Logic

Environmental Conditions – represented with Spatial Fuzzy Logic



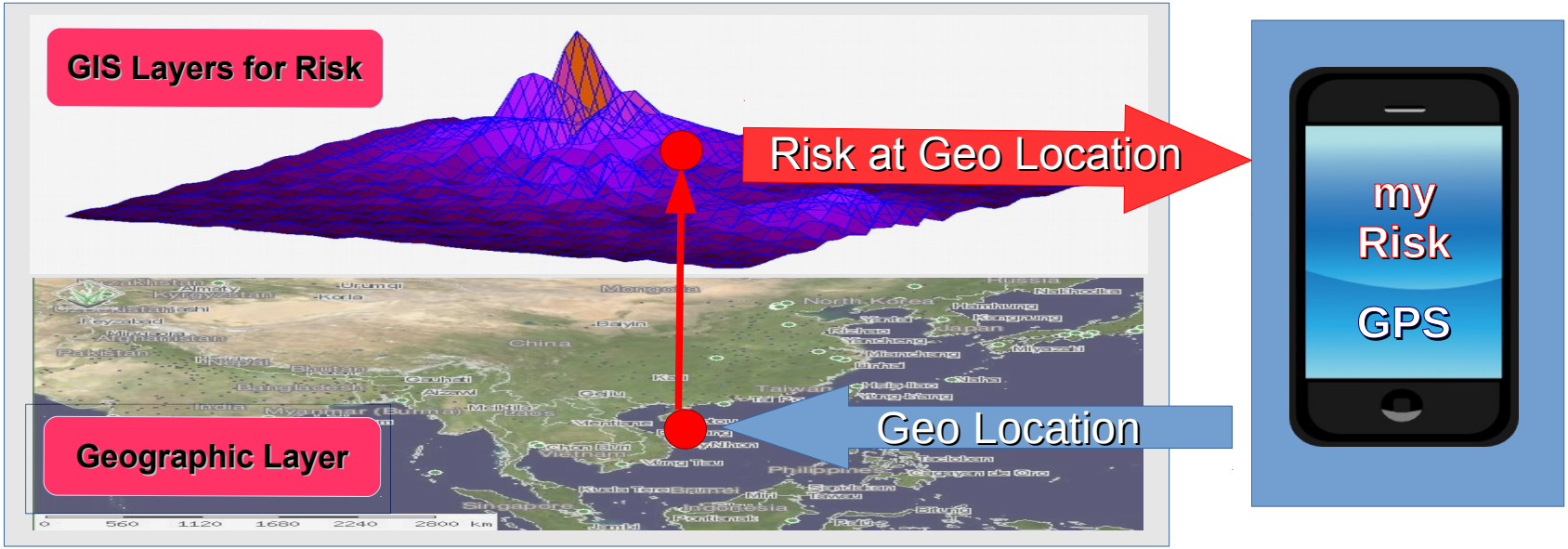
Forrest conditions - humidity
Requirement for bush fire



Current Bush Fires
incorporate wind / wood source / land use

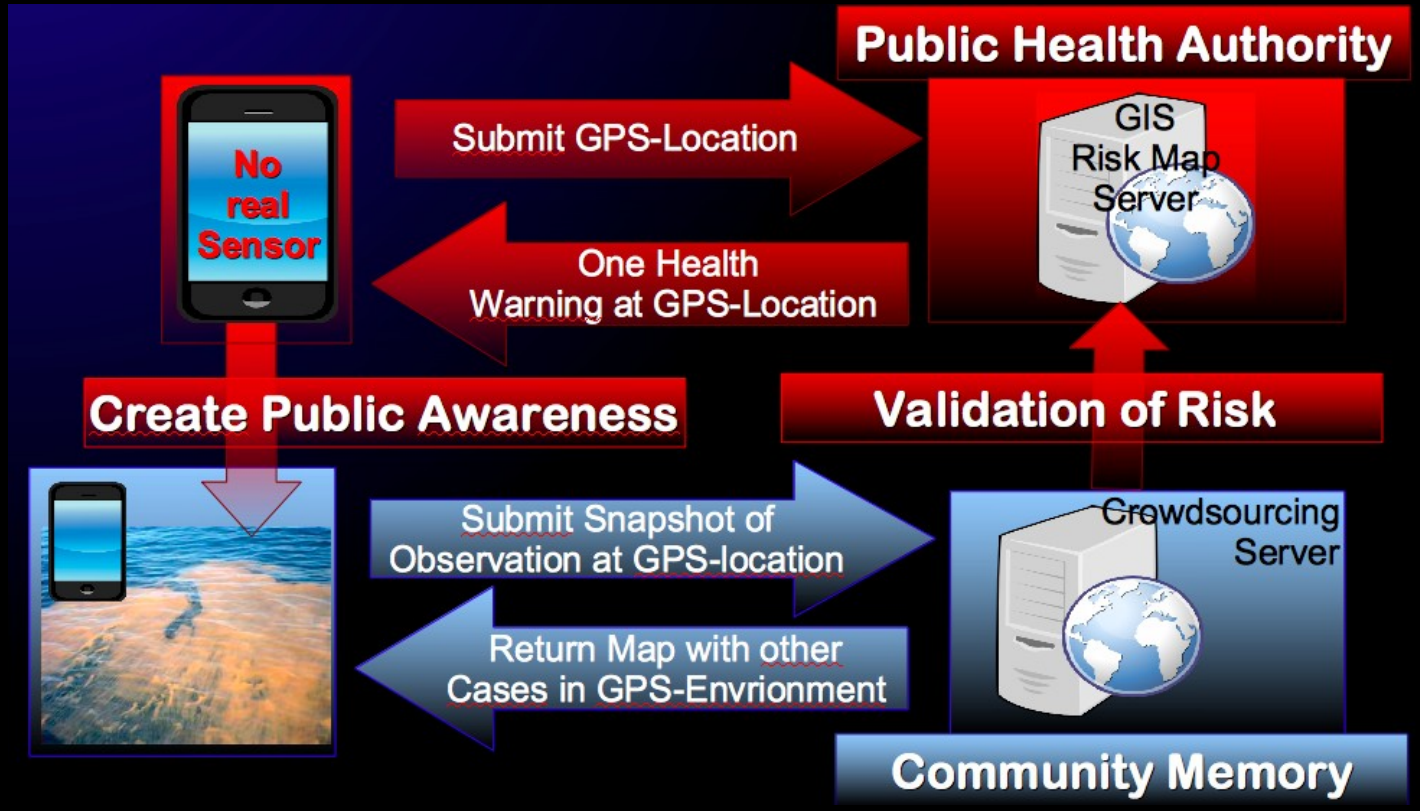
Tailored Response for Geolocation

Evaluation of Decision Support Layers with Mobile Devices



Validation of data products via **Digital Signature** on mobile device

Public Awareness, Crowd Sourcing, Public Health

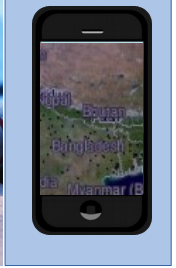


Summary

Space

- **Digital Signature** –
Trust in Decision Support on
Mobile Devices
Tailored Information

One Health



"Bridge" from Space to (One) Health Impact

Space Agency

Earth Observ GNSS

Digi. Signed Risk Feeds Resource Maps

Mobile Decision Support Client

Risk Literacy Citizens

Workflow Integration

Last Mile

WHO, Public Health Agencies

Summary

Allocate Resources according Risk

Disaster Management

Risk

Response

Assess Impact of Response for Risk Mitgation

GeoJSON
Spatial
Fuzzy Logic
Digital Signature

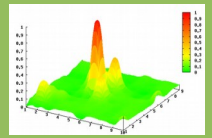
Disaster Management, Global Health and Space

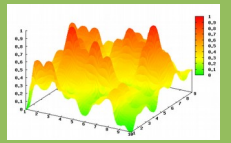
Space Asset Data

Digital Signature

UN-SPIDER Regional Support Office

Disaster Management
Global Health
Data Protection & Privacy





Spatial Decision Support System

URL: https://en.wikiversity.org/wiki/Digital_Signature

Thank you

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- **LibreOffice (PDF-Export)** for presentation (Presentation Guide)
- AudioSlides4Web to create Audio Slides from the LibreOffice-Export
  https://niehausbert.gitlab.io/audioslides4web/unspider2020
- **Audacity** recording of audio comment for the slides