



# Continuous Terrain Modeling from Image Sequences with Applications to Change Detection

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# Outline

**Introduction**

**Approach**

**Plans**

## Goal

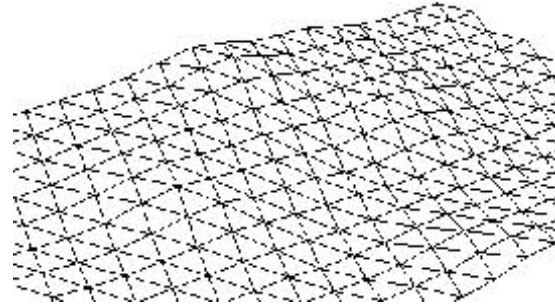
**Incrementally model and detect changes over large geographic areas from IFSAR data and EO & IR video data.**

**Detect *shape changes*, such as bomb damage and building construction, and *material property changes*, such as ground cover changes and new asphalt.**

## Approach

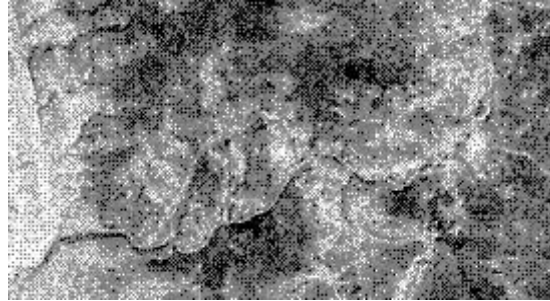
- **Create initial model:** from maps, IFSAR data, EO & IR video images, SAR data, ...
- **Detect changes:** by comparing 3-D geometry to new IFSAR data and by comparing synthetic images to new EO & IR images
- **Refine the model:** by continuously integrating new data
- **Extend the model:** by modeling adjacent regions covered by incoming data

**Initial 3-D Terrain  
Mesh**

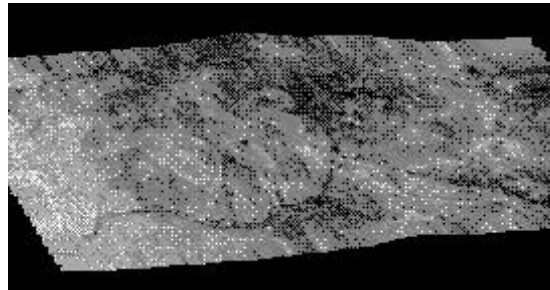


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**New Imagery and  
other Data**



**Refined 3-D Terrain  
Model with  
Material Properties  
and Detected Changes**



## Tasks

- **Develop uncertainty representations and techniques for iteratively refining uncertainty estimates**
- **Convert our deformable mesh optimization algorithm into a sequential process**
- **Develop 3-D change detection techniques**
- **Enhance the techniques for incrementally refining material property descriptions**
- **Develop techniques for identifying changes in material property descriptions**