



**First South East European  
Regional CIGRÉ Conference**

**SEERC**

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# **Possibilities of applying aerial survey using a helicopter for the purpose of OHL design and maintenance**

4-16

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# Contents

1. Aerial survey
2. Application of the surveyed data – OHL modelling
3. Survey based design services
4. Conclusion

# 1. Aerial survey

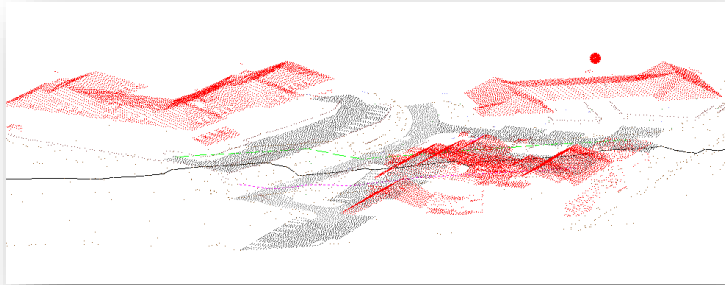
- Helicopter-borne camera used for terrain survey



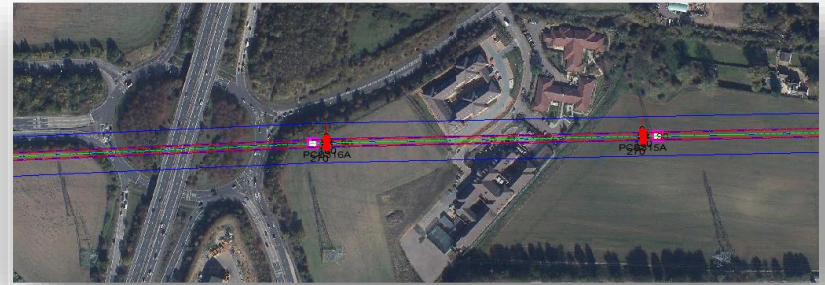
# 1. Aerial survey

- Various survey options:

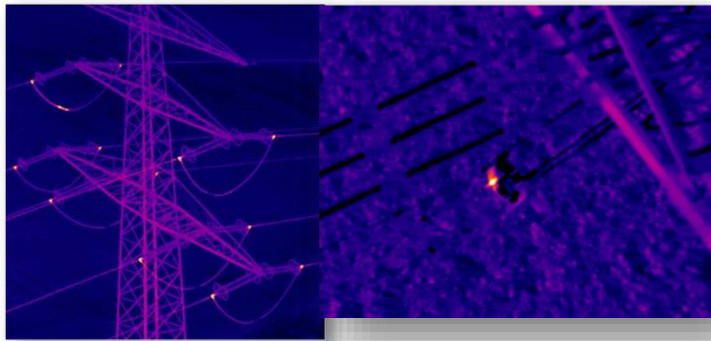
## LiDAR



## Digital orthophoto



## Thermovision

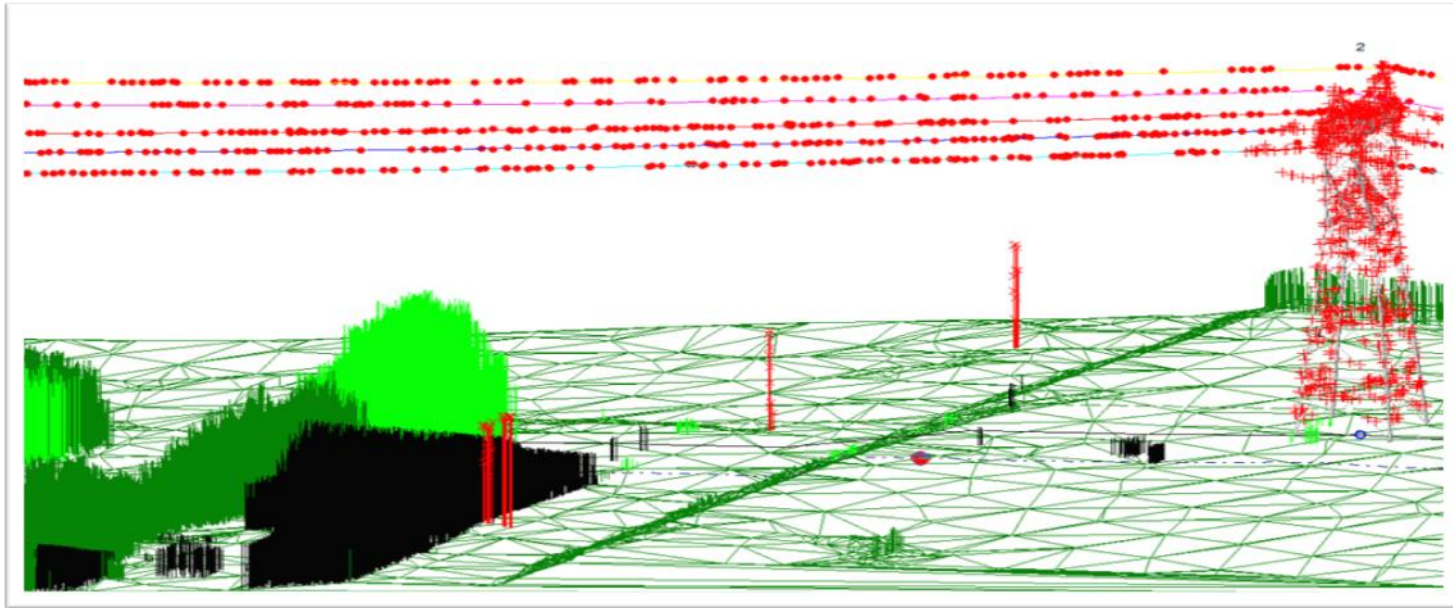


## High resolution photo



## 2. Application of the surveyed data

- Processing of the obtained data
- Development of a 3D model
- Geocoding of the model





# 2. Application of the surveyed data

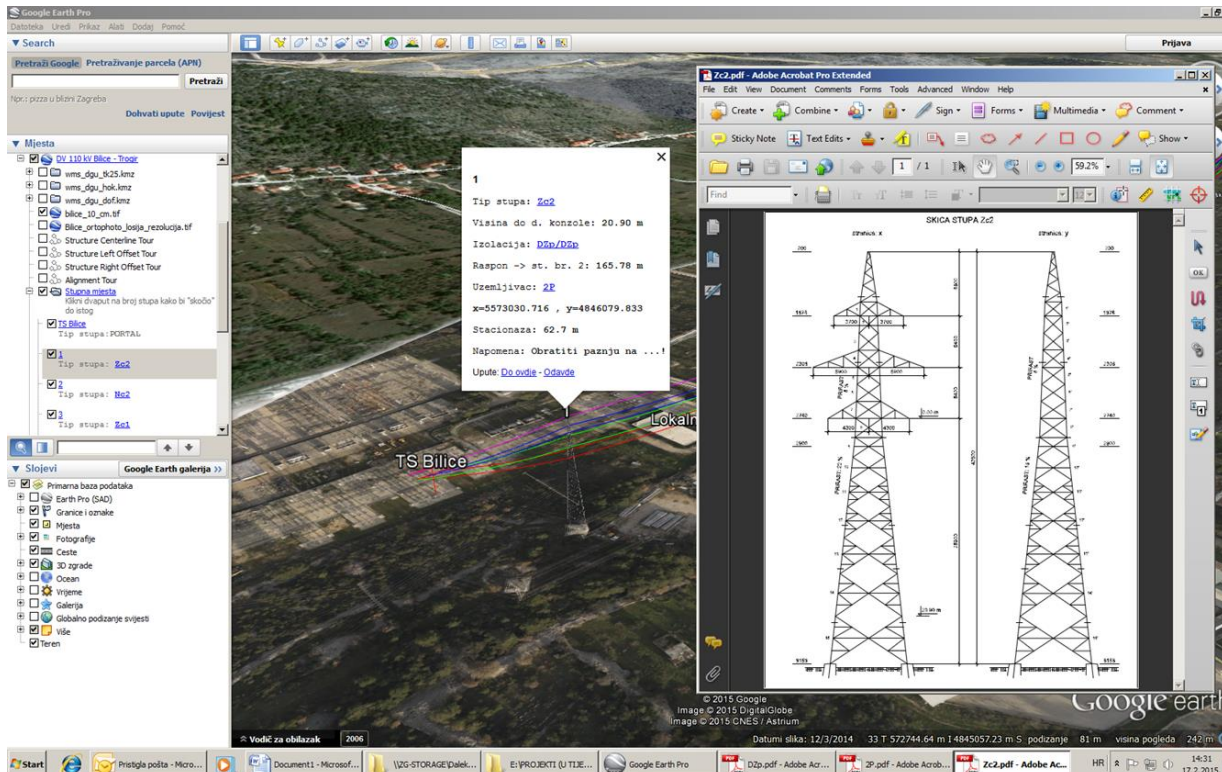
- Implementation of the developed 3D model into Google Earth



- Model synchronization with GPS devices
  - Site surveys (access roads)
- Availability of the model on tablets and smartphones
  - Practical application

# 2. Application of the surveyed data

- Implementation of the developed 3D model into Google Earth



– Built-in equipment and tower data

# 2. Application of the surveyed data

- Implementation of the developed 3D model into Google Earth

– Built-in equipment and tower data

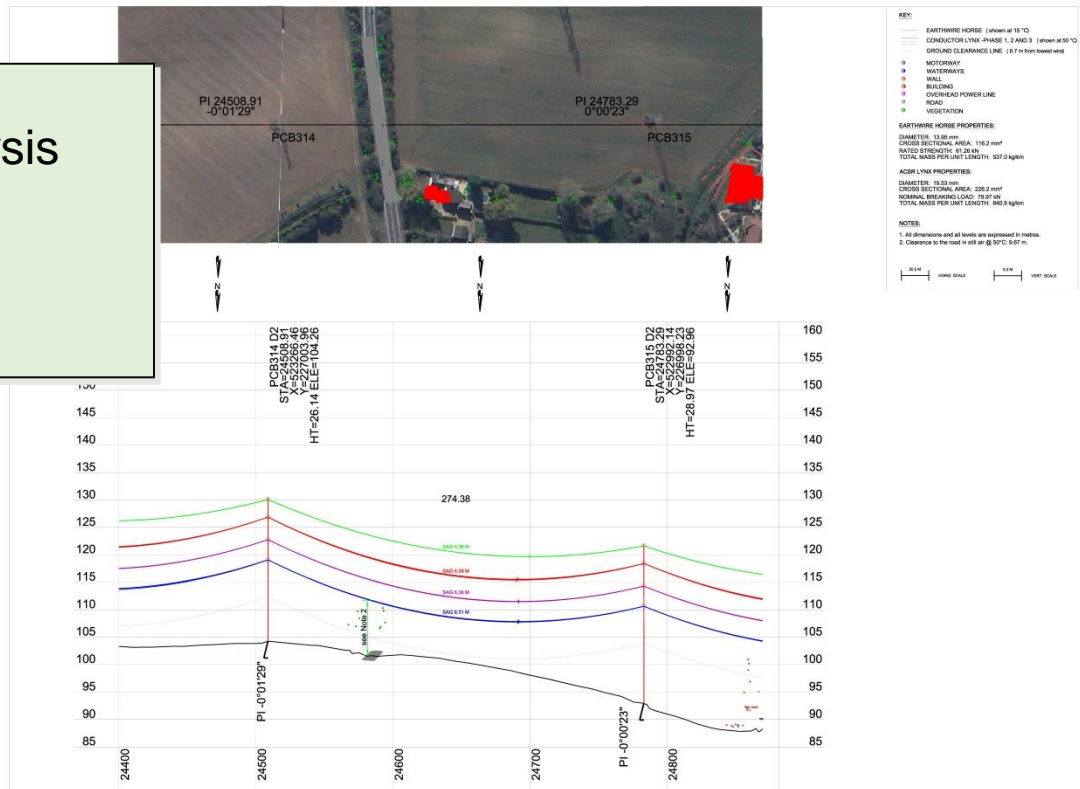
The screenshot displays the Google Earth Pro interface with a 3D model of a power line tower labeled 'TS Bilice' overlaid on a satellite view. A technical drawing window titled 'DZp.pdf - Adobe Acrobat Pro Extended' is open, showing a cross-section of a double-circuit, insulated tower. The drawing includes a table of technical specifications for the tower components.

NAZIVNI NAPORI: 110 kV					
VOZNO: HRENČIŠĆI-ROŠKVAČ					
MIN. PREDJENA SE. A (bez zakrme inazduha): 120 kN					
MIN. PREDJENA SE. A (bez zakrme inazduha): 73,3 kN					
MASA (bez traktora): ~ 13,8 t					
MASA S DOKLATORIMA: ~ 80,8 t					
3	Višina s oškom	1	22,45 10	kov. ošak	podložano
4	Poklonska streljica	1	21,50 200	alufite	
7	Donji razvodni nos	1	41,18 26	kov. ošak	podložano
8	Donji razvodni nos	1	41,18 26	kov. ošak	podložano
9	Zaklonska kompozitna streljica	1	20,50 200	alufite	
4	Zaklonska s oškom	2	24,80 10	kov. ošak	podložano
3	Višina s podiznom	2	22,25 10	kov. ošak	podložano
2	Donja ošak	2	20,53 30	kov. ošak	podložano
1	Višina s oškom 35°	1	22,20 30	kov. ošak	podložano
RAZ. NAZIV	ROŠK. KAT. RAZ.	MATERIAL	NAPORENA		

# 3. Survey based design services

- A comprehensive design analysis based on the surveyed data and 3D OHL models

- Existing condition analysis
- Refurbishment list
- Feasibility study
- Detail design



# 3. Survey based design services

- A comprehensive design analysis based on the surveyed data and 3D OHL models

- 
- ```
graph LR; A["Existing condition analysis  
Refurbishment list  
Feasibility study  
Detail design"] --> B["Built-in equipment overview  
Clearance checks  
Identification of critical items and elements"]
```
- Existing condition analysis
  - Refurbishment list
  - Feasibility study
  - Detail design

- *Built-in equipment overview*
- *Clearance checks*
- *Identification of critical items and elements*

# 3. Survey based design services

- A comprehensive design analysis based on the surveyed data and 3D OHL models

- 
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- *Based on:*
  - *Historical data*
  - *N-1 analysis*
  - *Economical data (i.e. Loss-of-load probability, operational costs..)*

# 3. Survey based design services

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- 
- Existing condition analysis
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- *Load flow calculation*
- *Conductor analysis*
- *Power loss analysis*
- *Calculation of costs*

# 3. Survey based design services

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- *Workshop drawings*
- *Detail checks and simulations*
- *Construction bill of quantities*
- *Line profiles and tower lists*

## 4. Conclusion

- Highly accurate 3D model that enables in-depth electrical and mechanical checks
- Possibility of comprehensive feasibility analysis and detail design checks
- Practical use – GPS navigation during site surveys
- Cost and time efficiency

**Thank you for your attention!**