

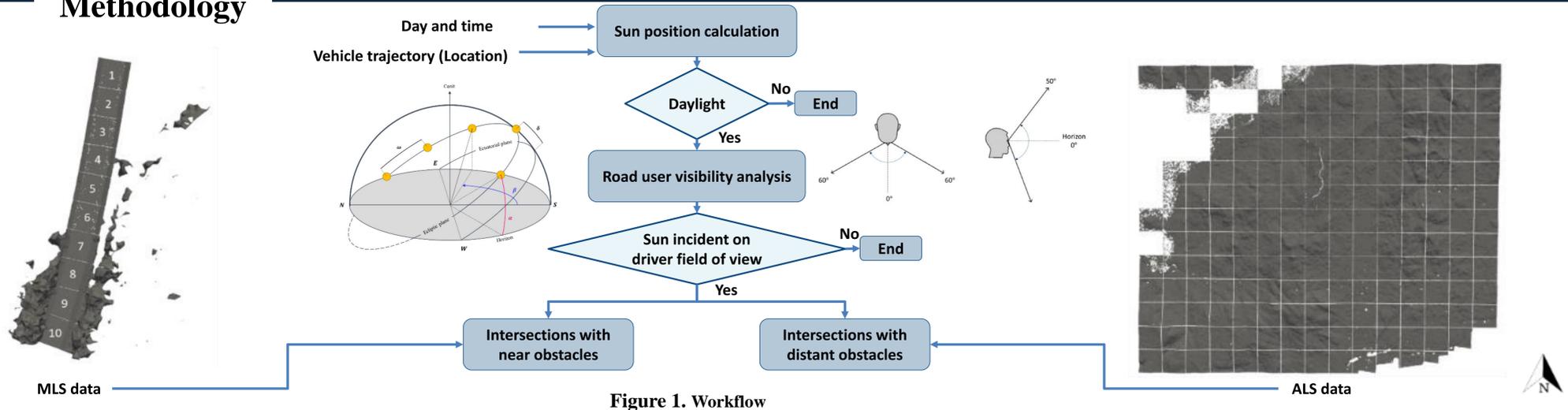
AUTOMATIC MAPPING DIRECT SUN GLARES ON ROADS WITH POINT CLOUDS. CASE STUDY OF EP2005, VIGO, SPAIN

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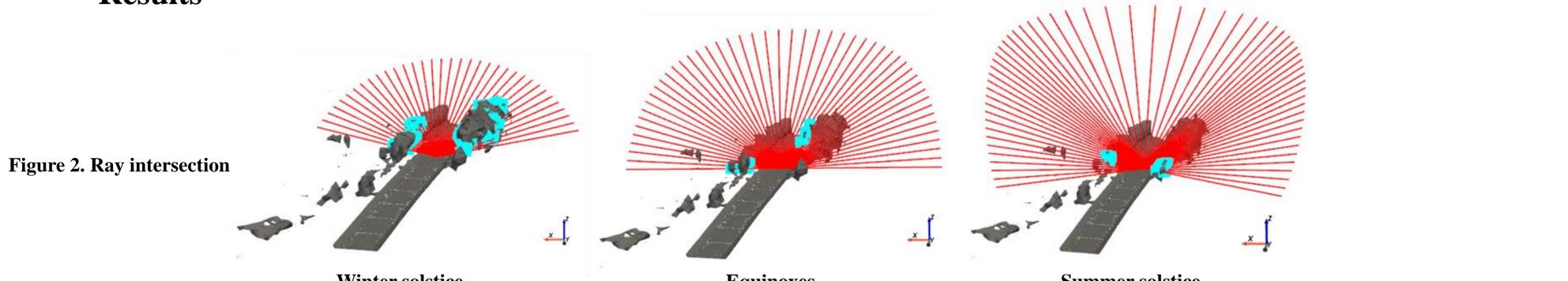
Introduction

According to data from the *Dirección General de Tráfico* (DGT), 5% of traffic accidents in Spain are caused by sun glares during twilight hours (EuropaPress, 2018) and after a sun glare, recovery of visual functions can take up to 50 seconds. Sun glares affect both people and machine vision systems, where the image is burned by direct exposure to the sun. In this work, a method is applied to detect direct sun glares on drivers along a road for any time and date from point clouds.

Methodology



Results



Winter solstice

Solar hour	Distance (m)																	
	Seg 1		Seg 2		Seg 3		Seg 4		Seg 5		Seg 6		Seg 7		Seg 8		Seg 9	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
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- No sun glare on the driver field of view
- Sun occluded by nearby road objects
- Sun occluded by nearby and distant road objects
- Sun occluded by distant road objects
- Direct Sun glare

Figure 3. Sun glares and causes

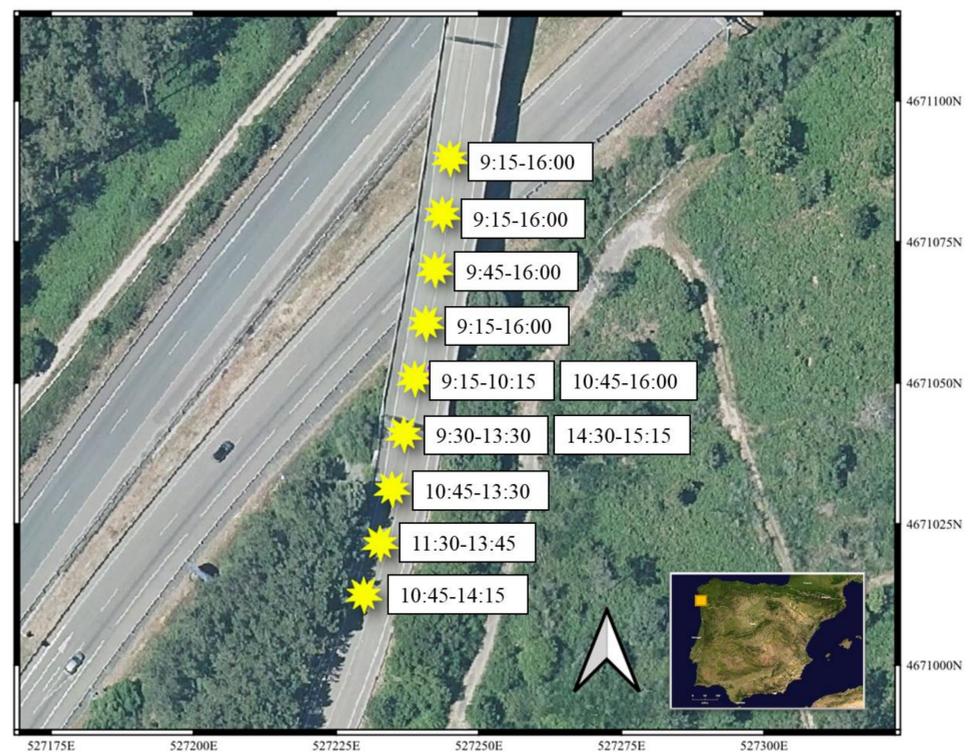


Figure 4. Map of direct sun glare in EP2005 road during winter solstice

Conclusions

- The method calculates the direct incidence of sun rays, considering the Sun's position, driver position, driver bearing, road slope and objects.
- Intersections with near and distant obstacles in the road environment from MLS and ALS can be obtained from point clouds.
- The method is configurable for use at different times and days of the year, as well as for different intervals along a road in any location.
- Direct sun glares can be integrated in navigation systems to warn drivers.