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ROTAMARKA™

White Paper - Distances at which power line markers can be seen by aircraft

14/12/18

Introduction.

Aircraft colliding with Power Lines is an ongoing threat the world over. This problem is particularly prevalent in the agricultural industry due to the use of Aerial Services to spray crops, perform inspections, muster livestock etc. Power Lines routinely cross agricultural lands to provide power to working farms and properties. One of the most effective ways to prevent such collisions, is to install “Markers” onto the Power Lines. A Marker is a device which when installed, grips onto a Power Line and provides a visual stimulus making an otherwise difficult to see Power Line visible. There are a number of versions of these “Markers” in the marketplace including the Balmoral Engineering ROTAMARKA™ which comes in a variety of different colour combinations. These different colour ROTAMARKA™s along with some other Marker types were tested in the field to see which performed the best.

(Dalby September 2018)

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The Trials.

Staged in Dalby, Queensland Australia with the assistance of Keyland Air Services, The Aerial Application Association of Australia, Energy Queensland and Universal Drones. The site was a typical agricultural property in south central Queensland farming Cotton. A Power Line runs through the property connecting to the Energy Queensland Network. This Power Line dissects the farming lands creating a potential risk to Pilots providing agricultural services such as Aerial Spraying and Seeding.

With the assistance of Energy Queensland, a series of Markers were installed on this Power Line that crosses the property. On the 12th of September, with the help of Frank Drinan from Keyland Air Services, several fly overs were performed. The Aircraft had been fitted with technology utilised in the industry allowing a more comprehensive mapping of the first instance the Markers were visible from the Cockpit. The Pilot navigated the Plane charting a course perpendicular to the Power Line and starting far enough back that all Markers and the Power Line were outside the field of view. Upon flying towards the Power Line at an average speed between 150 - 200 kph, the Pilot would activate his spray device (holding only water at the time). This would trigger a GPS reading allowing the distance measurements at which the Marker was first seen to be logged into a database. The Pilot would fly under the Power Line and then circle back and re align the Aircraft perpendicular to the next position of Markers.

In the results below, the right hand column of the table lists various GoPro video recordings from the Cockpit.

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ROTAMARKA™

Results.

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KEYLAND AIR SERVICES
Airborne Crop Protection

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Professional Aerial Spraying, Spreading and Seeding Services

18 September 2018

Aerial Application Association of Australia
PO Box 353
Mitchell ACT 2911

Dear Phil

Please find below a table explaining the attached map.

No on Map	Distance Sighted	Marker Description	Go Pro
1	408m	Flag – to left side	0139
2	900m	Rota Yellow/white	0140
3	1,250m	Rota Yellow/black	0141
4	900m	Marker to left	0143
5	1,435m	Rota Red/white	0145
6	672m	Rota Red/black	0147
7	1,340m	Rota Yellow/white	0148
8	1,950m	Rota Red/white	0149
9	850m	Ronstadt marker (football)	0151
10	322m	Flag (to left of screen)	0152
11	1,660m	Rota Red/white	0154
12	350m	Rota Red/white	0155

Also find attached, the completed trial assessment form.

Should you require anything further, please don't hesitate to contact me.

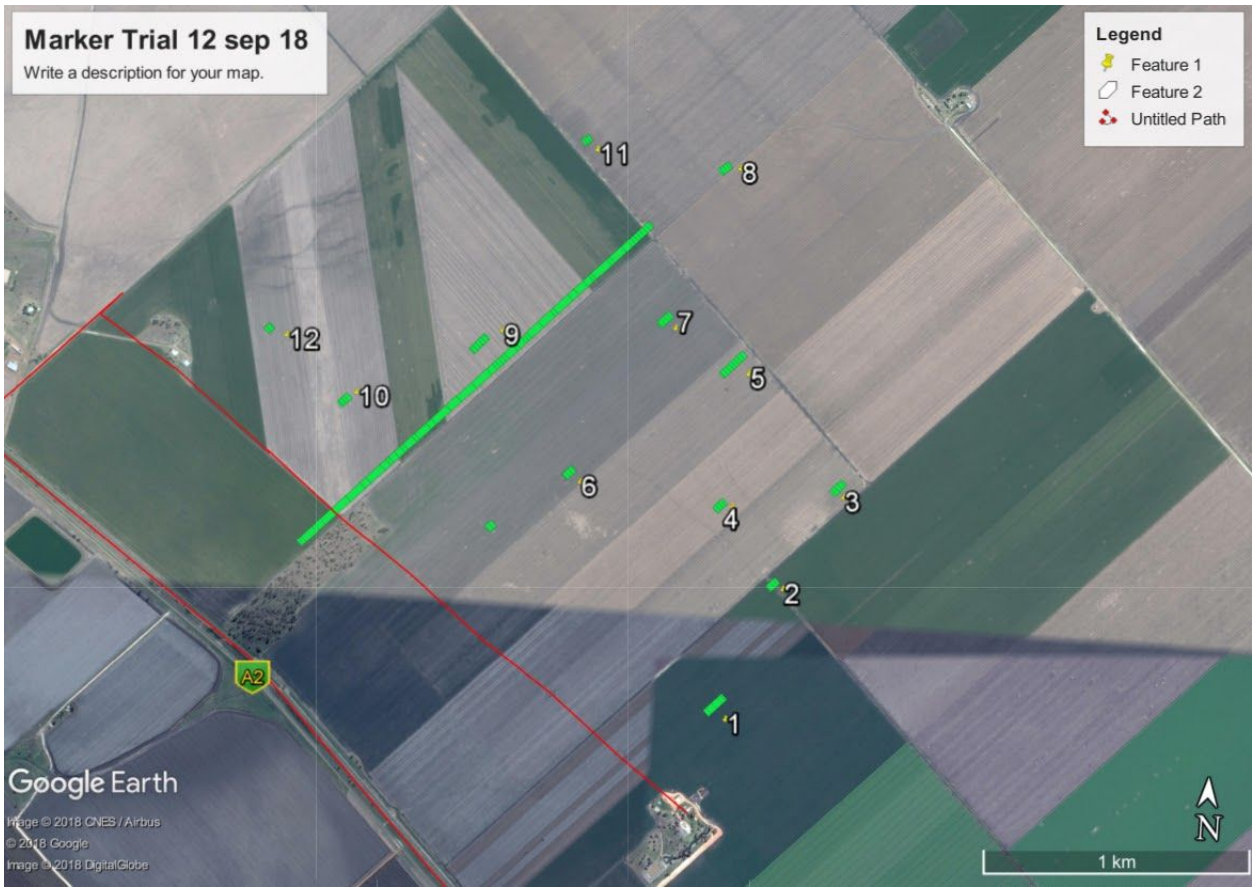
Kind regards

Frank Drinan
Operator/Chief Pilot

DRINAN GROUP
Nec opprimere nec opprimi

KEYLAND AIR SERVICES
Airborne Crop Protection

SOUTH BURNETT AIR SERVICES
Airborne Crop Protection



Conclusion.

On average, the red and white ROTAMARKA™ yielded the greatest viewing distance to the Pilot when compared to the other colour combinations tested (ROTAMARKA™) as well as the other Marker type devices tested.

For video footage demonstrating some of these field trials, please refer to the link below:

https://www.youtube.com/watch?v=ERreEGqkc94

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