



**The  
Certification  
of  
Lighter-Than-Air  
UAV Systems**

**AIRSCAN**

**Remote Services Limited**  
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**UAV 2002**

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# Report Documentation Page

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# AIRSCAN Programme

- **LTA UAV System Airship**
- **Phase 1 – Exploratory**
  - ✦ Fully EU funded
  - ✦ Completed September 2001
- **Phase 2 – Risk reduction**
  - ✦ 50% funded by the EU
  - ✦ Start Sep 2002
  - ✦ Duration 24 months
  - ✦ Customer and User Network
- **Phase 3 – Commercialisation**
  - ✦ AIRSCAN Europe Ltd

# Management Team

**AIRSCAN**  
**Europe**

## ■ SME Partners

- ◆ Remote Services Ltd (UK) – Co-ordinator
- ◆ DST Control AB (Sweden)
- ◆ Euformatics BV (Netherlands)
- ◆ Stirling Dynamics Ltd (UK)

## ■ Research & Technical Contractors

- ◆ Fokker Space BV (Netherlands)
- ◆ QinetiQ Ltd (UK)

# Additional involvement

- Additional Contractors
  - ◆ Skyships Limited (UK)
  - ◆ CDL Systems (Canada)
  - ◆ Systemware Inc. (USA)
  - ◆ JRA Aerospace Ltd. (UK)

# Current RPV airships

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**Electric**

**Low Mass**

**No  
Pollution**

**Low Speed**

**Quiet**



**Low KE**

**Conspicuous**

# Example AIRSCAN Operations

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- Policing
  - ◆ Crowd surveillance
- Farming
  - ◆ Crop yield management
- Environmental monitoring
  - ◆ City pollution monitoring
- Entertainment
  - ◆ Aerial Video

## Bridges to build

- Public Acceptance
- Customer Acceptance
- Regulatory issues
- Operational Issues
- Technical Issues
- Commercial Issues



# Regulatory Issues

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- Airspace Policy (CAA – DAP)
- Safety Regulation (CAA - SRG)
- Economic Regulation (CAA - ERG)
- Environmental (DETR)

# Airspace Principles for UAV Operations in the UK (1)

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- UAV operators should seek to operate within existing arrangements
- UAVs will not have an automatic right to airspace
- UAV operators must ensure that their aircraft show an equivalent level of compliance

# Airspace Principles for UAV Operations in the UK (2)

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Europe**

- the routine flight of any UAV outside a UK danger area will not increase the risk to existing users and will not deny airspace to them
- In the near-term, ..... will almost certainly involve the exclusive use of temporary segregated airspace
- The provision of an Air Traffic Service (ATS) to a UAV must be transparent to the ATC controller

# Equivalence

## ■ Collision Avoidance

- ◆ ANO Rule 17 states “it shall remain the duty of the commander of an aircraft to take all possible measures to ensure that his aircraft does not collide with any other aircraft.”

## ■ Right of way

- ◆ flying machines shall give way to **airships** and balloons
- ◆ **airships** shall give way to gliders and balloons
- ◆ gliders shall give way to balloons
- ◆ **mechanically driven aircraft** shall give way to aircraft which are towing other aircraft or objects.

## ■ Weather

# Safety Regulation

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- Operating Standards
- **Design and Production Standards**
  - ◆ Approval of organisations, certification and validation of aviation products, and the monitoring of their continued airworthiness in service.
- Aerodrome and Air Traffic Standards
- Personnel Licensing

## **SRG UAV Policy (1)**

- UAV systems on the UK Civil Register should hold valid certificates of airworthiness
- Airworthiness design requirements will be derived from the existing codes of requirements as currently applied to manned aircraft.

## **SRG UAV Policy (2)**

- If any function of a UAV System is essential to continued safe flight and landing of the UAV, that function, and the equipment performing the function, shall be considered as part of the aircraft for the purposes of the validity of the certificate of airworthiness of the UAV.
- Organisations undertaking design and/or manufacture of civil UAVs will be required to hold appropriate approvals under JAR 21 or similar requirements acceptable to the CAA.

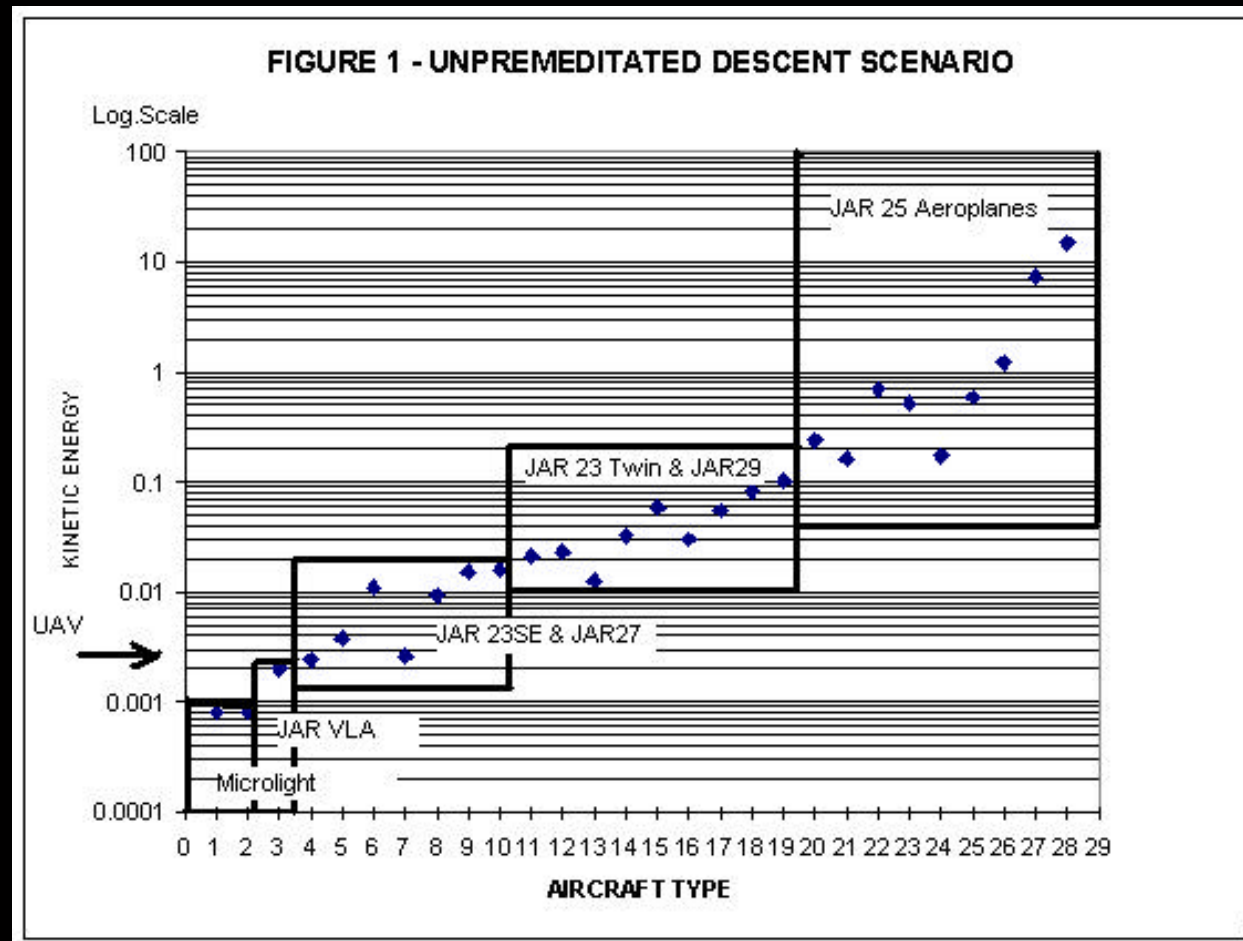
# Main CAA failure criteria

- Unpremeditated descent
- Loss of control



# Kinetic Energy at impact

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# Electric LTA UAV Operational considerations

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- Safety
  - ◆ No combustible fuel hazard
  - ◆ Minimum impact hazard
- Specific features
  - ◆ Minimal air disturbance
  - ◆ Quiet
  - ◆ No environmental impact
  - ◆ Safe two man operation

# Size Matters

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so does velocity and mass ...

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**40 knots**  
**30Kg**  
**6KJ**

**120 knots**  
**1100Kg**  
**2MJ**

# Launch site

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# Operational Area

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# Scenario development

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**Synthetic Environments**

**Training  
Pre/post flight  
Real-time**

**Flight Data  
Radar Data**

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## The future

“If an autonomous unmanned airship cannot be certified then there is little chance that rotary or fixed wing UAVs will achieve the same.”



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