

Aerodinamične rešitve prenesene v prakso

Seminarska naloga
2005/06

Andrej Ropret, 3. VSŠ, 23020087

JAT krü: "Ready for departure?"



Rectangular wing

Piper PA-38 Tomahawk



Elliptical wing



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Supermarine Spitfire

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Tapered wing



Pilatus PC-9

Delta wing



Mirage 2000

Backward swept wing

Tupoljev Tu-134



Forward swept wings



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Suhoj Su-47 Berkut

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Wing anhedral



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BAe-146 / RJ-85

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Aerospitale-BAC
Concorde

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Wing dihedral



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Boeing 777-300

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Aspect Ratio

High AR



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DG-800 B

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Diamond DA20-A1 Katana



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Boeing 737-800



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Airbus A330

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Flying a high AR airplane





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Boeing 737-800

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Aspect Ratio

Low AR



Goodyear F-4U Corsair

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AR=5.35



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Grumman X-29

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AR=3.91

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Combined primary control surfaces

Elevons

Elevator + Aileron = Elevon



Ruddervators

Rudder + Elevator =
Ruddevator



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Beechcraft Bonanza

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F-117 Stealth Fighter



Flaperons

Flaps + ailerons = Flaperons



McDonnell Boeing F/A-18 Hornet



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Suhoj Su-35 Flanker

Andrej Ropret, 3.VSŠ, PPL

Suhoj Su-37 Flanker

- Flaps + ailerons = Flaperons
- Differential flaperons (assymetrical deviation)
- Elevators + ailerons
- Canards
- Auto-Slats
- Ventral fin
- Wingtip fence with missile carrier
- Vectored Thrust



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Suhoj SU-37 Flanker

Andrej Ropret, 3.VSŠ, PPL

Slats



Socata Rallye



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McDonnell Douglas MD-83

Andrej Ropret, 3.VŠŠ, PPL

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Boeing 747-400

Andrej Ropret, 3.VŠŠ, PPL

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Kruger flaps



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Boeing 707

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Boeing 747-200

Trailing edge Flaps

Plain flaps



Piper PA-38
Tomahawk

Slotted flaps



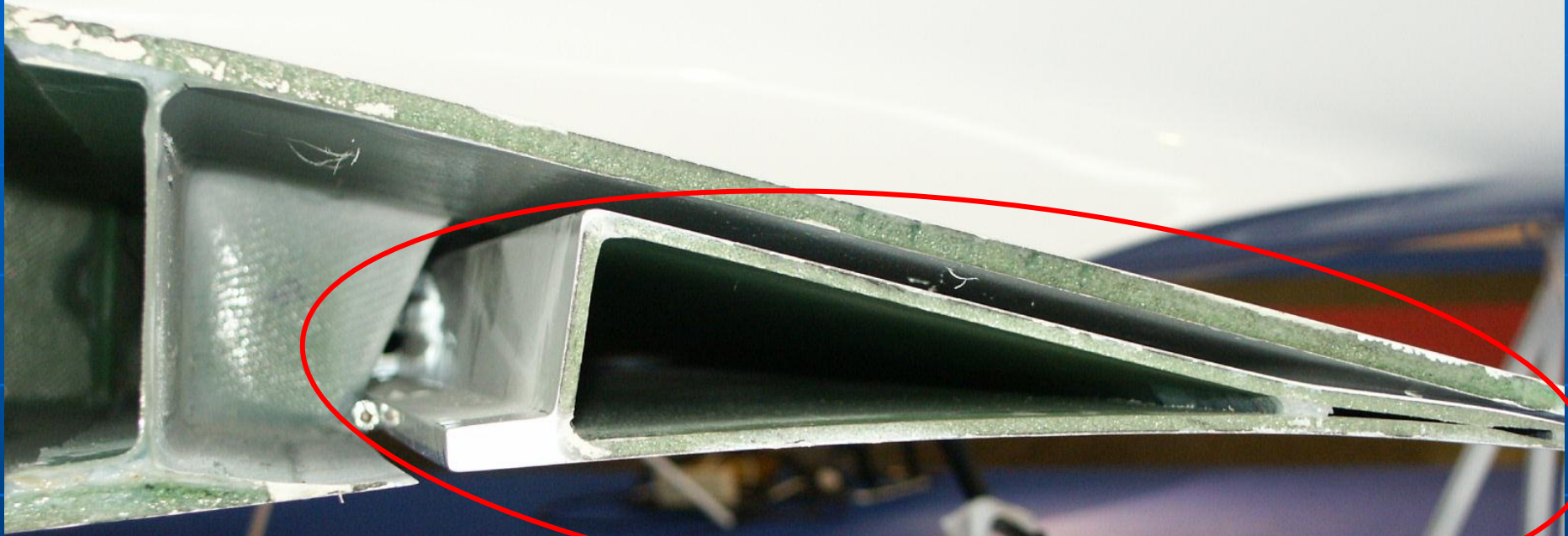


Pilatus PC-6 Porter



Split flaps

Pilatus PC-9
Hawker Hunter





Hawker Hunter

Fowler flaps



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Airbus A320

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Strake

Vortex strakes increase the
directional stability

Fixed surfaces



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McDonnell Douglas MD-83

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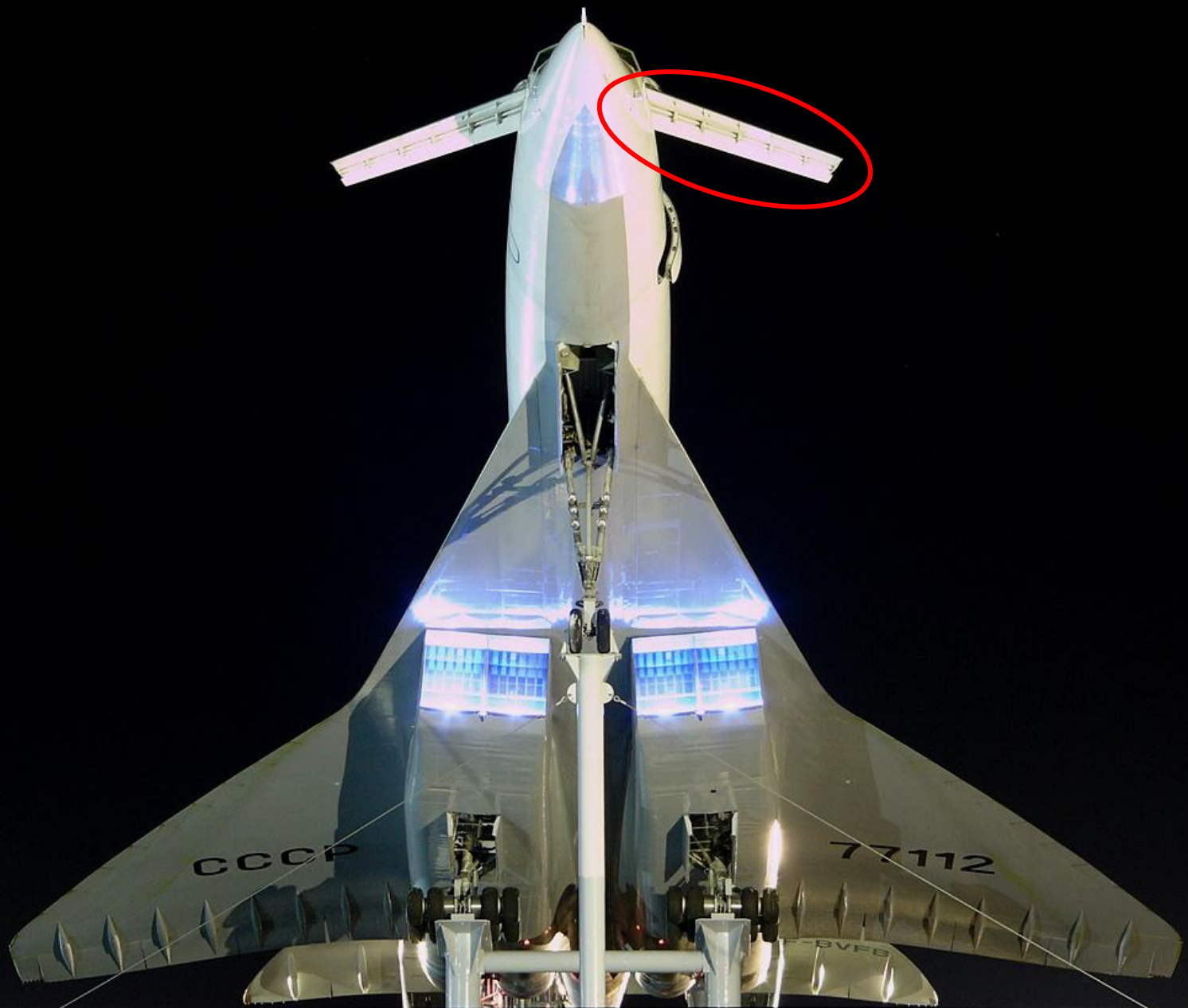
Aeropitale-BAC Concorde

Canards

Movable surfaces



Saab JAS-39 Gripen



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Tupolev Tu-144



Piaggio P-180 Avanti

Pitot probe



McDonnell Boeing F-15E Eagle

Piper PA-18 Super Cub



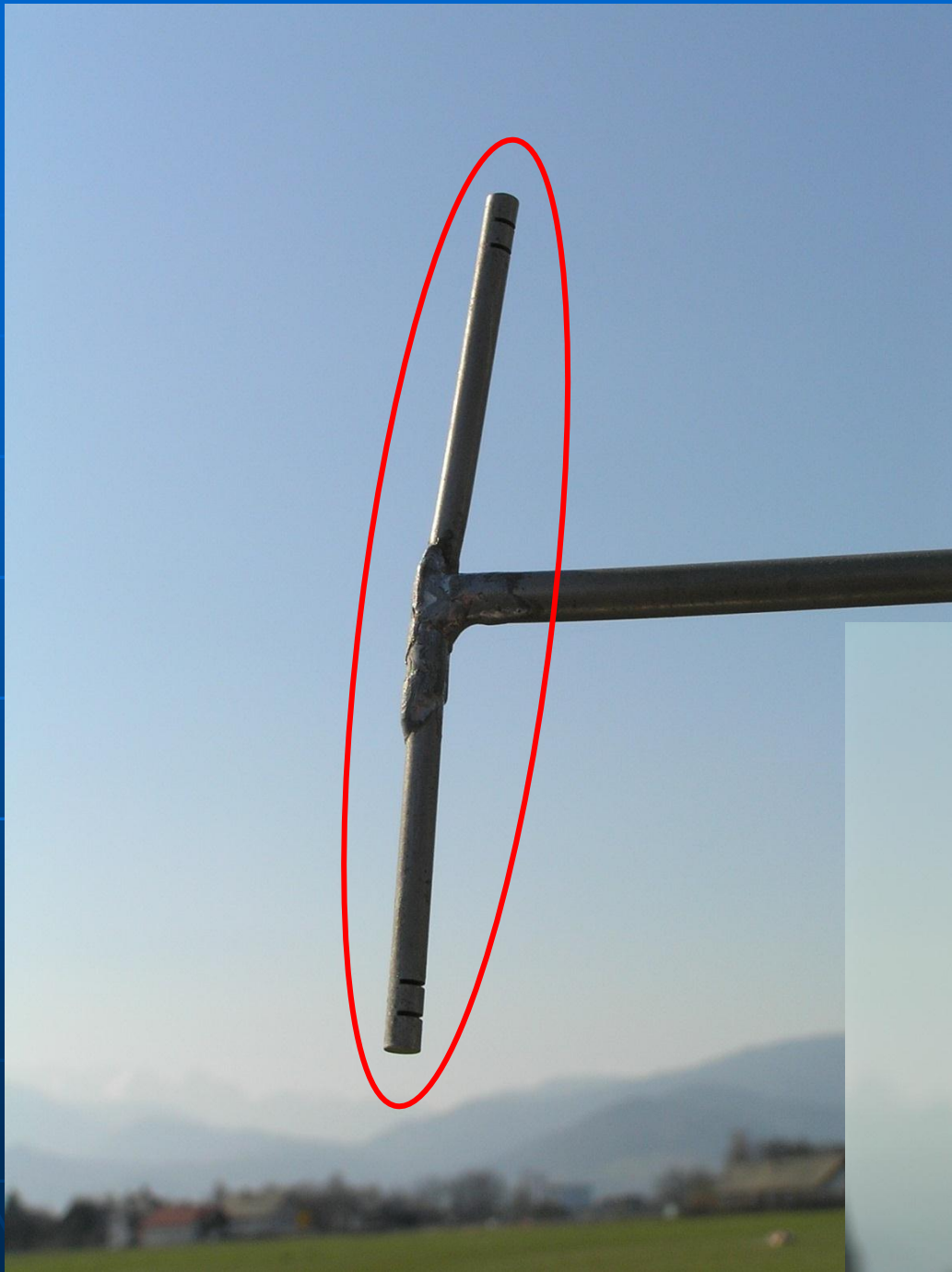
Static ports

Airbus A320



Variometer compensator





Static dischargers



Dassault Falcon 900EX

AOA probes

AOA – Angle Of Attack



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McDonnell Boeing C-17 Globemaster



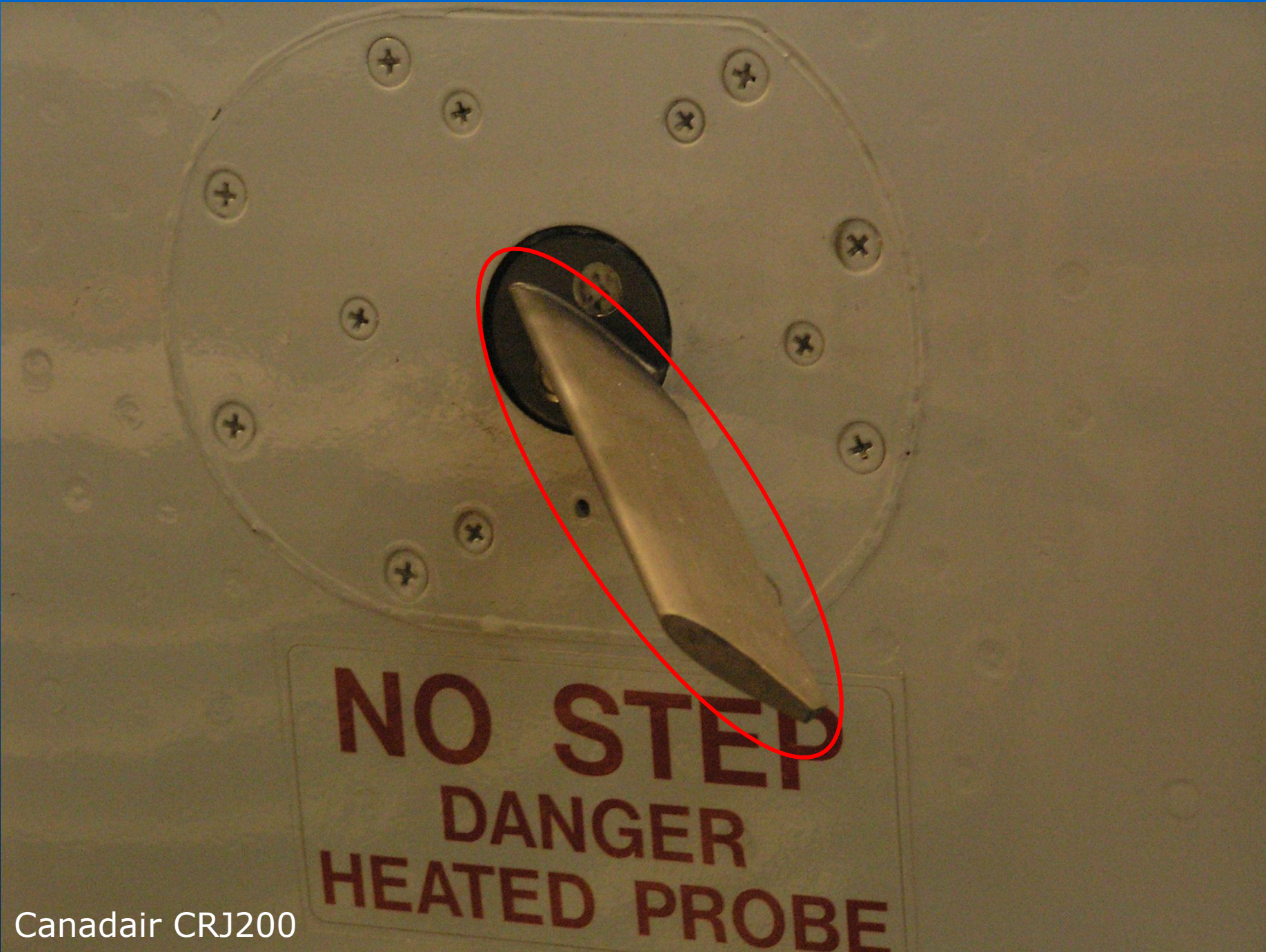
Boeing F-15

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Airbus A300-600ST Beluga



**NO STEP
DANGER
HEATED PROBE**

Canadair CRJ200

Flying at high AOA

Tupoljev Tu-144





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Saab JAS-39 Gripen

Andrej Ropret, 3.VSŠ, PPL

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Spoilers

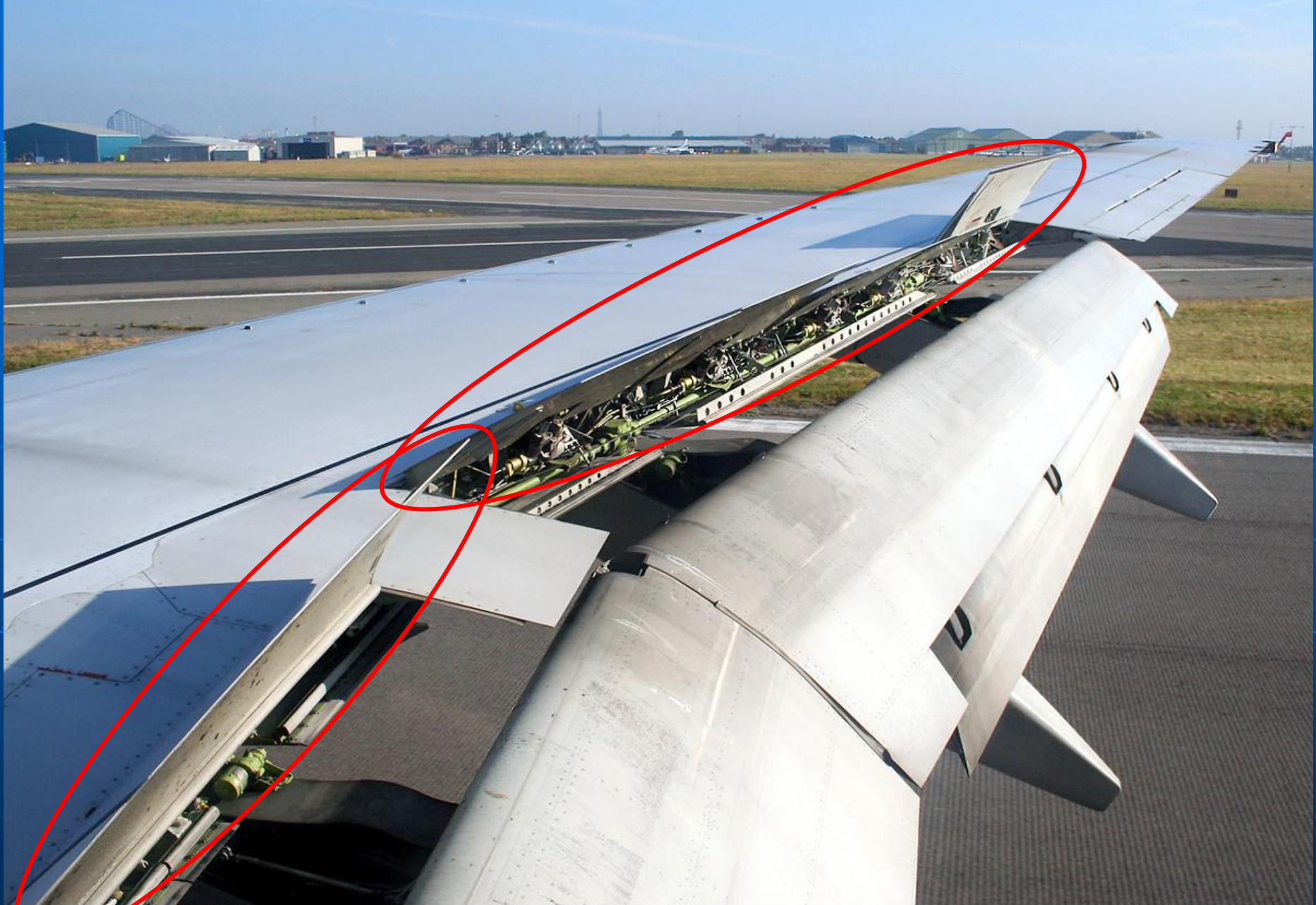




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Fokker F-70/100

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Spoilers and Airbrakes

BAe-146





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Suhoj Su-27/30/35/37 Flanker

Andrej Ropret, 3.VSŠ, PPL

Spoilerons

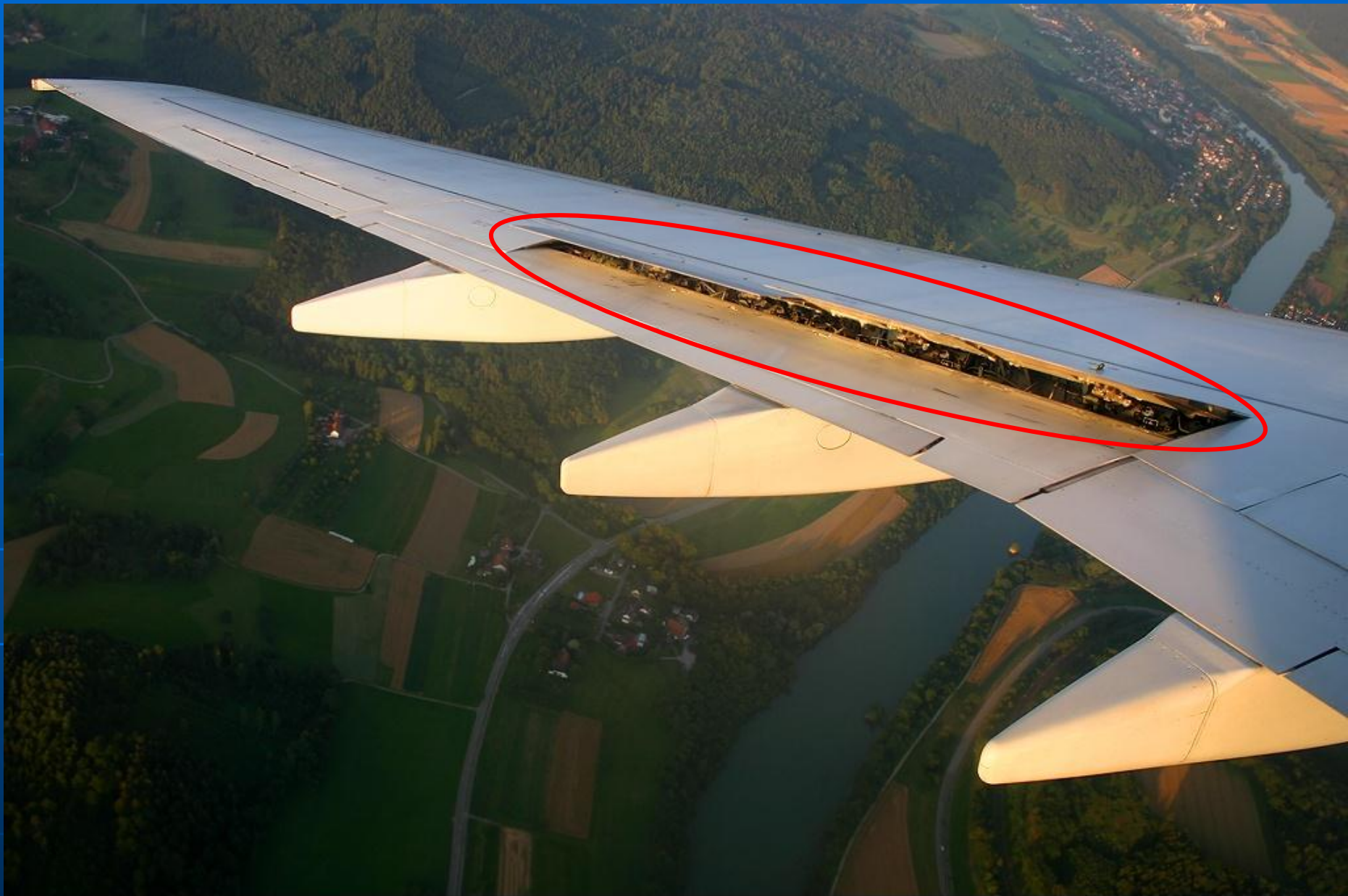


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Wing tip modifications

Plain wing

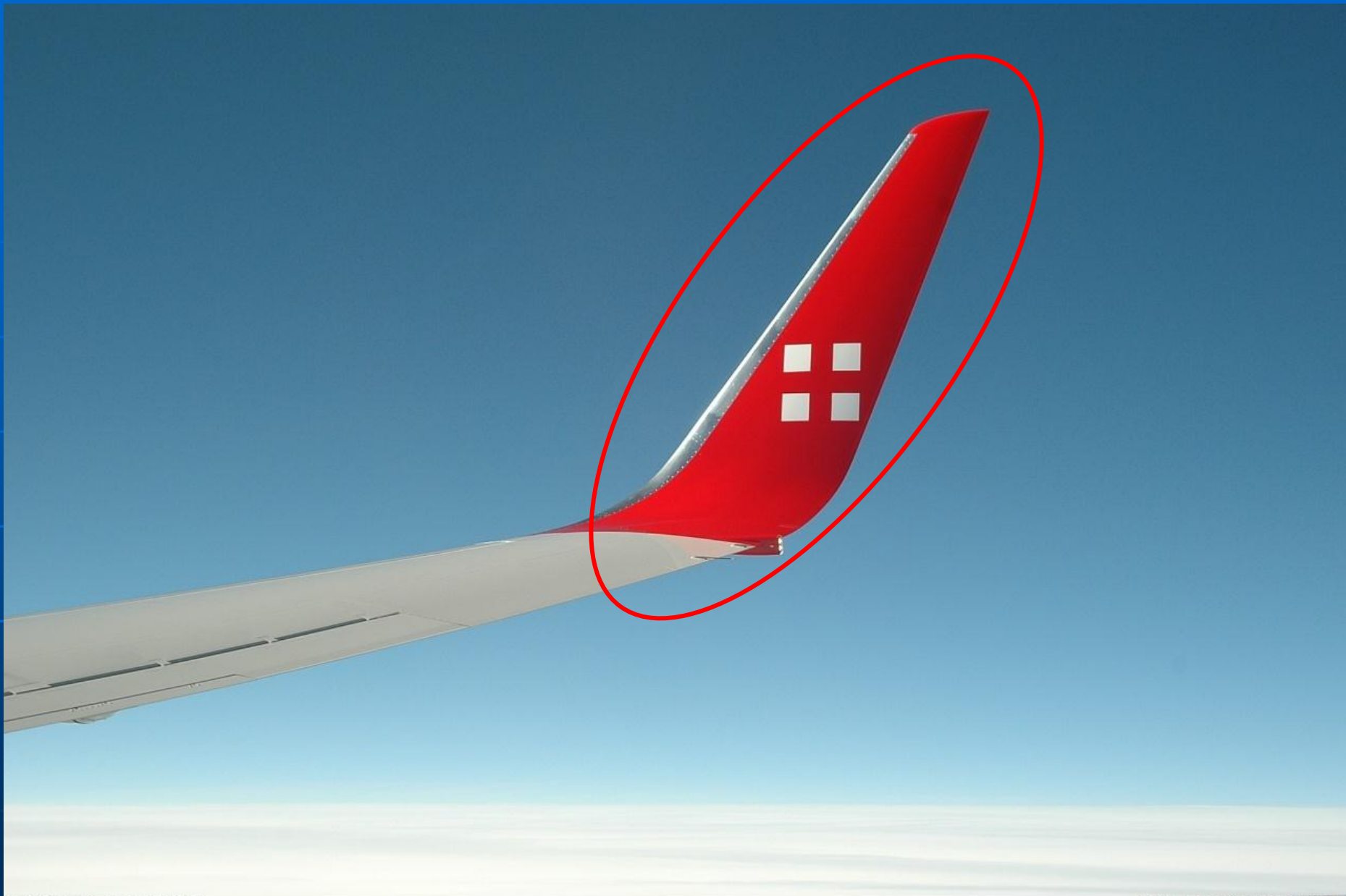


Piper PA-38 Tomahawk

Winglets



Airbus A380



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Boeing 737-800/900/BBJ2

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Airbus A330



Diamond DA-42 TDI Twin Star

Modified wing



Piper Pawnee

Wingtip tank

Dassault Falcon
900EX



Let L-410 Turbolet



Wing fence



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Boeing 737NG

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Dassault Falcon 20



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Dassault Falcon 20

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Photo by David Hartman

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Vortex generators



Pilatus PC-21

Pilatus PC-21



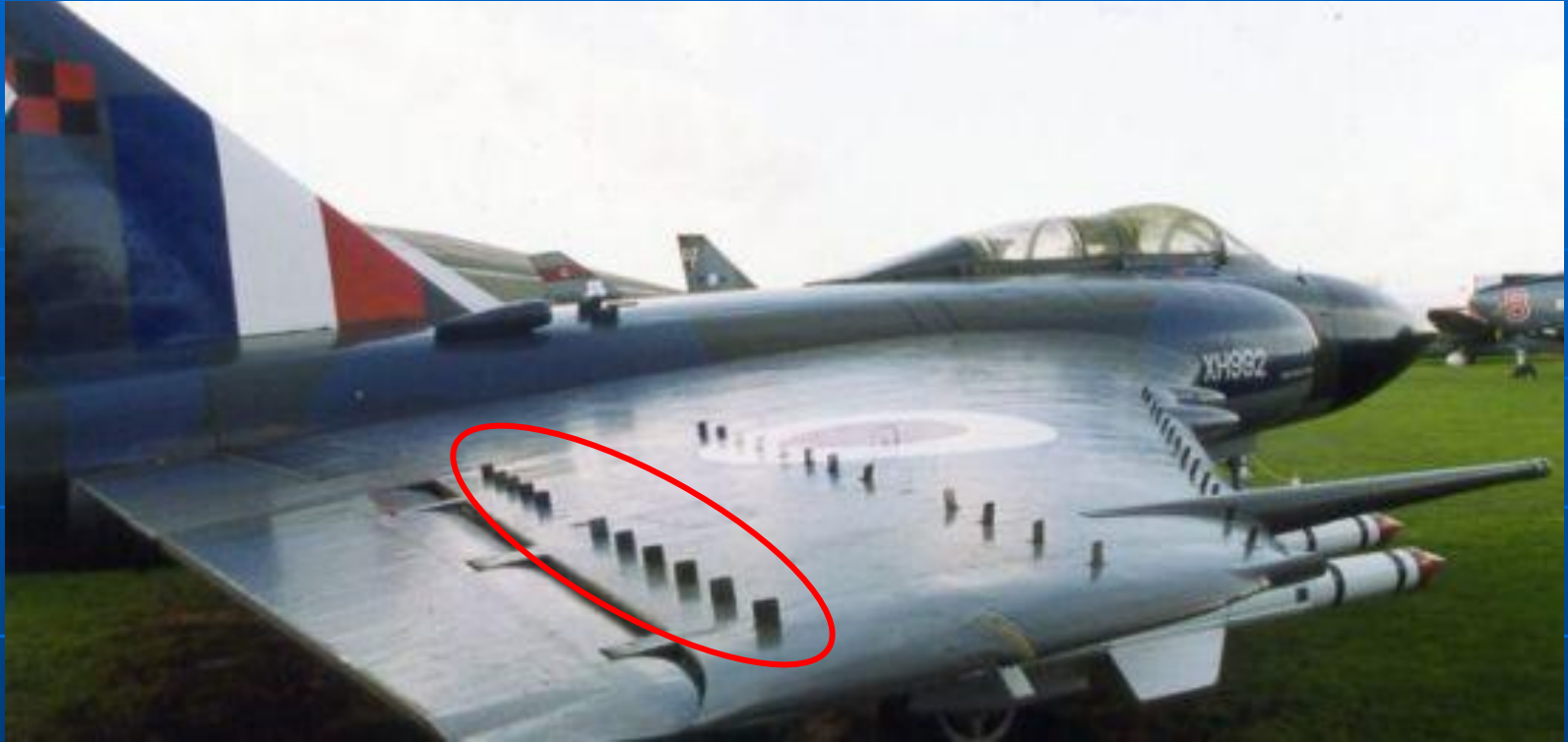


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Embraer Brasilia EMB-120



Gloster Javelin



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Gloster Javelin

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Boeing 777-200/300



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Andrej Ropret, 3.VŠŠ, PPL

McDonnell Boeing C-17 Globemaster

Induced drag



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Boeing 757

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McDonnell Douglas DC-10

Flare with ground effect



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McDonnell Douglas MD-87

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Induced + Interference = Parasite Drag



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Boeing 767

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McDonnell Douglas MD-83



Jet trails

Wing-tip vortex trails

Airbus A340



Air vapour



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McDonnell Douglas MD-11

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Airbus A300-600ST Beluga

Ventral fin

Bombardier Learjet 45



Dorsal fin



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Fokker F-70/100

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Pilatus PC-9M

Dog-toothed leading
edge



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Saab JAS-39 Gripen

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STOL aircraft

STOL = Short Take-Off and
Landing

Piper PA-18 Super Cub
Pilatus PC-6 Porter
Canadair Dash 7
McDonnell Douglas C-17 Globemaster

McDonnell Douglas C-17 Globemaster



Pilatus PC-6 Porter



Pilatus PC-6 Porter @ Final approach



Engine mount angle



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Variable Incidence Horizontal Stabiliser



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Reverse thrust



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Boeing 747-400

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Panavia Tornado

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Propeller design and shape



Pilatus PC-21

Douglas DC-6B





C-130J
Hercules



Push propeller

RAT

Ram Air Turbine



Saab J-35 Draken



Sonic barrier

... $M < 1.0$



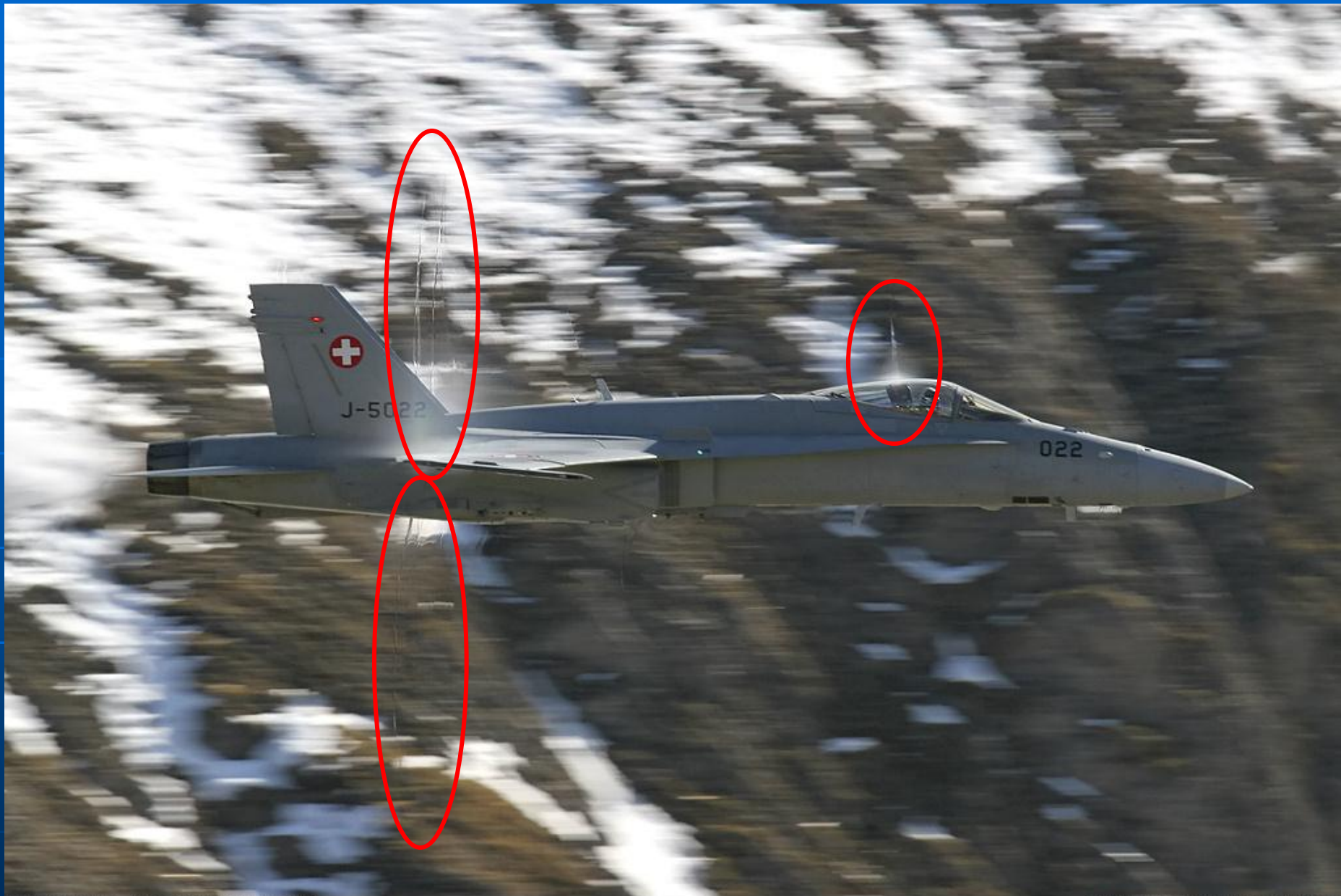
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McDonnell F/A-18E Super Hornet



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McDonnell F/A-18 Hornet

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Icing conditions

Let L-410 UVP-E Turbolet



PAX window



Windshield during icing conditions



Propeller spinner @ icing





Out of icing
conditions





Ice felt from prop spinner on apron after LDG

Ice detector probe

Canadair CRJ200LR



STEP
DANGER
HEATED PROBE

Namesto konca...

Za vsakega nekaj, saj je prav
vsaka nekaj posebnega...





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Imejte oči odprte, ko
gledate stvari...

...ki vam dvignejo pulz!

Vprašanja?

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