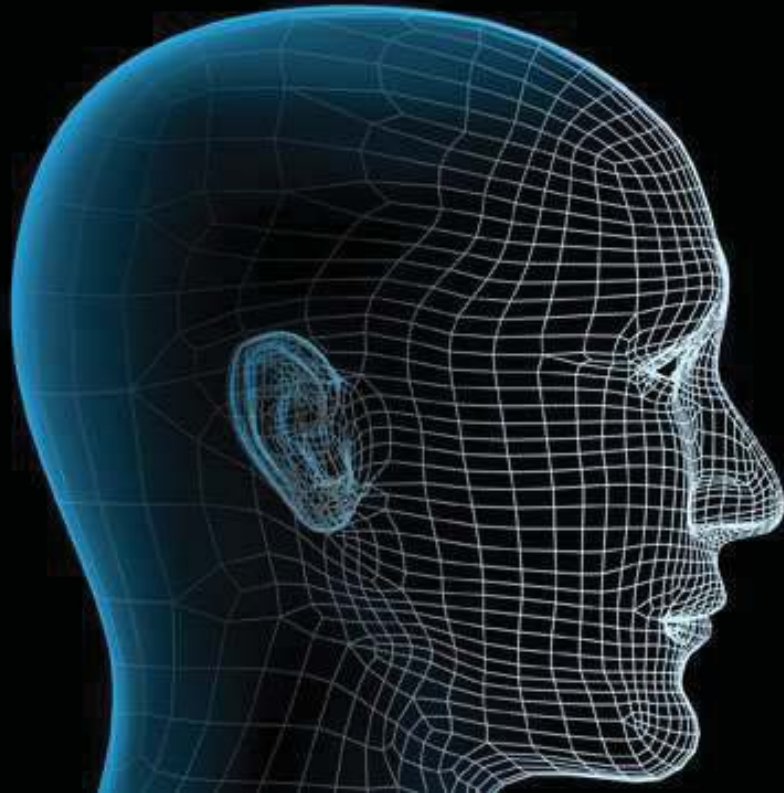




UAV

Unmanned Aerial
Vehicle

Research & Development
Project

HISTORY AND SKILLS

**Research & Development
of „Small UAV with
electrically powered
propeller“**

Description of the solution:

- Airframe,electronics, 2 battery sets
- 1 spare Airframe, battery charger
- Transport hardtop casing and backpack for field operation
- Interface – touchscreen laptop and video antenna

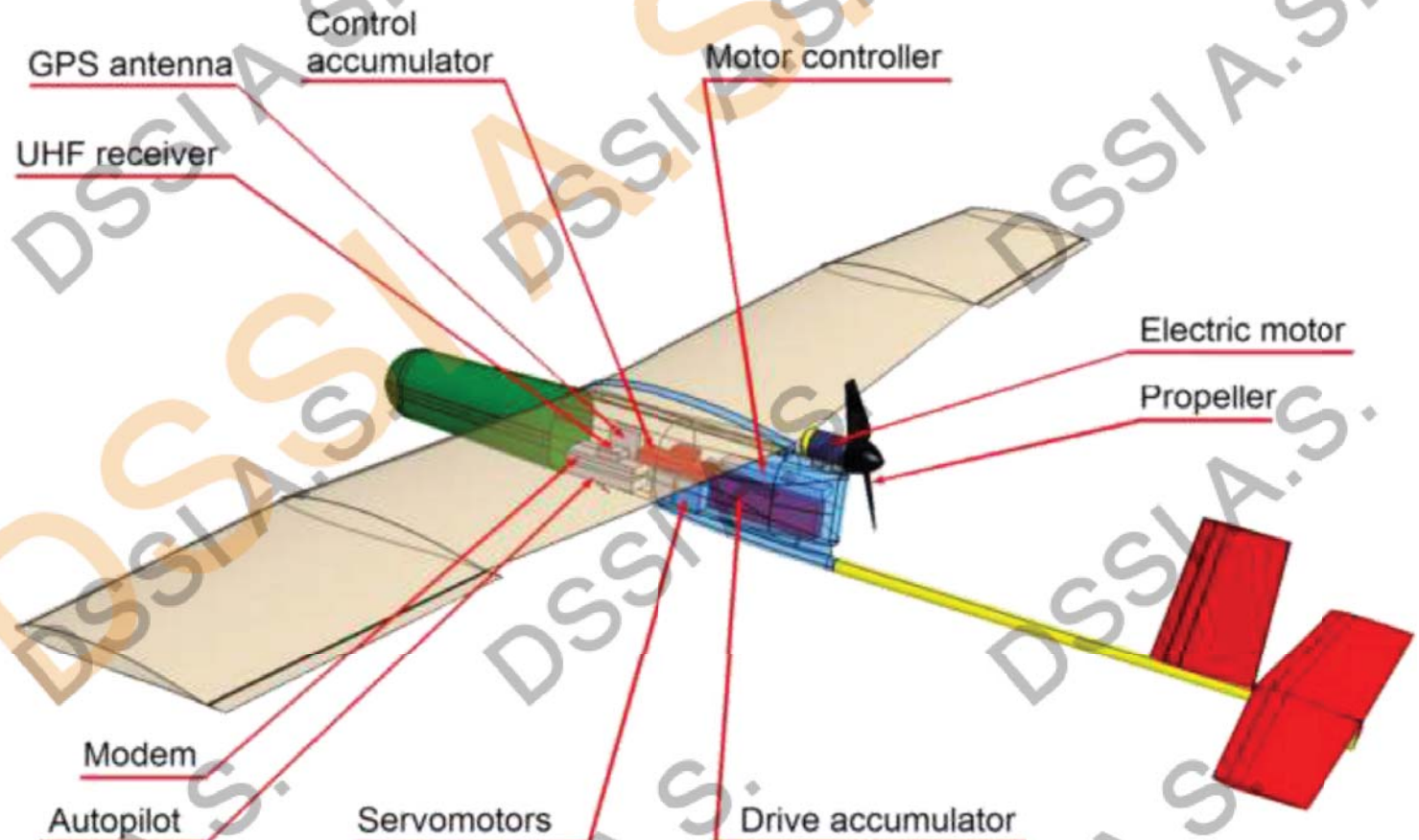


**UAV – Small Unmanned Reconnaissance Aerial
Vehicle (2006)**

HISTORY AND SKILLS

Layout of main drive and control units

Research & Development
of „Small UAV
with electrically
powered
propeller“



HISTORY AND SKILLS

**Research & Development of
„Small UAV with electrically
powered propeller“**

Technical parameters:

- Span: 220 cm
- Length: 125 cm
- Weight: cca 3 kg
- Payload : up to 1 kg
- Silent electric motor
- Endurance : up to 2 hours
- Range : 50 km



**Real flight tests during
dusk and night**



UAV

Unmanned
Aerial Vehicle

Research & Development
Project

Current R&D project: UAV - Model **MS**

Project target:

Development of middle
Unmanned Reconnaissance
Aerial Vehicle equipped with a
Turbojet engine - **Model MS**

The UAV is designed for
subsonic speeds (up to
400km/h), middle sized,
intended for reconnaissance,
surveillance or special
applications. Flight control
system will be Auto, Semi and
Manual.



Model MS

Actual R&D project: UAV - Model MS

Turbojet engine **TJ100**

Velká Bíteš (Czech Republic)

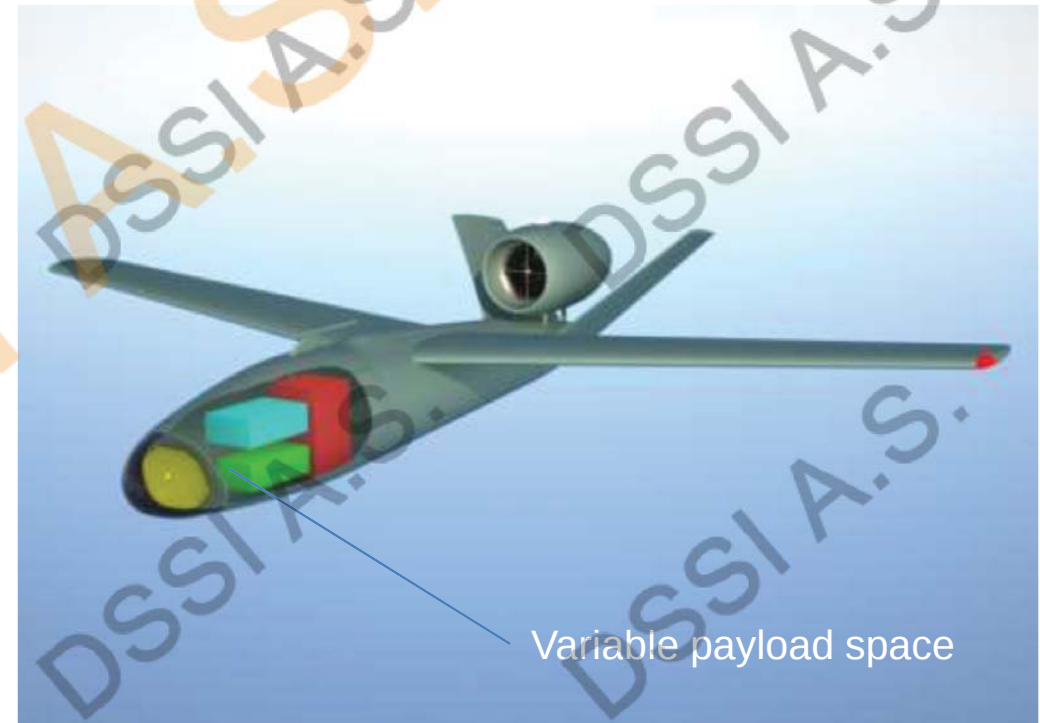
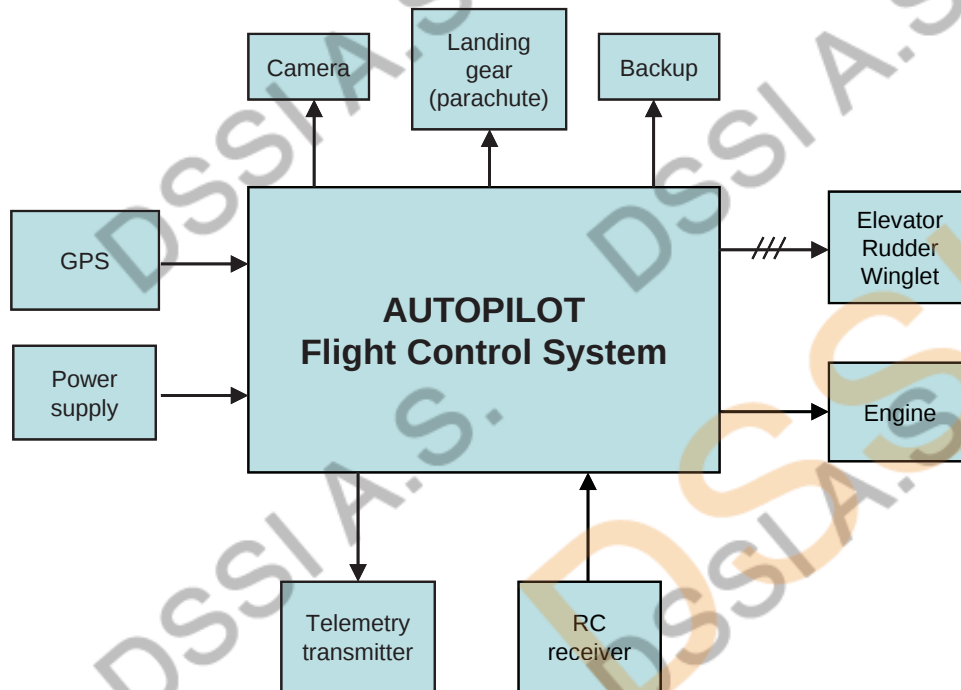


Aircraft parameters:

- Airframe configuration – classical
- V-tail type
- Length $L=4$ m
- Airframe body diameter $D=0,7$ m
- Wing span $W=5$ m
- Chord span $B=0,6$ m
- Takeoff weight 300 kg
- Payload weight 30 kg
- Engine type – turbojet engine TJ100
- Control surfaces – elevator, rudder
- Kill switch (cut off)
- Aircraft material – combination of graphite composites and aluminum alloy

Actual R&D project: UAV - Model MS

AUTOPILOT – Flight Control System (FCS)



Proposed configuration of the UAV provide

- Great flight stability
- High efficiency of the thrust engine
- Small aerodynamic resistance

Actual R&D project: UAV - Model MS



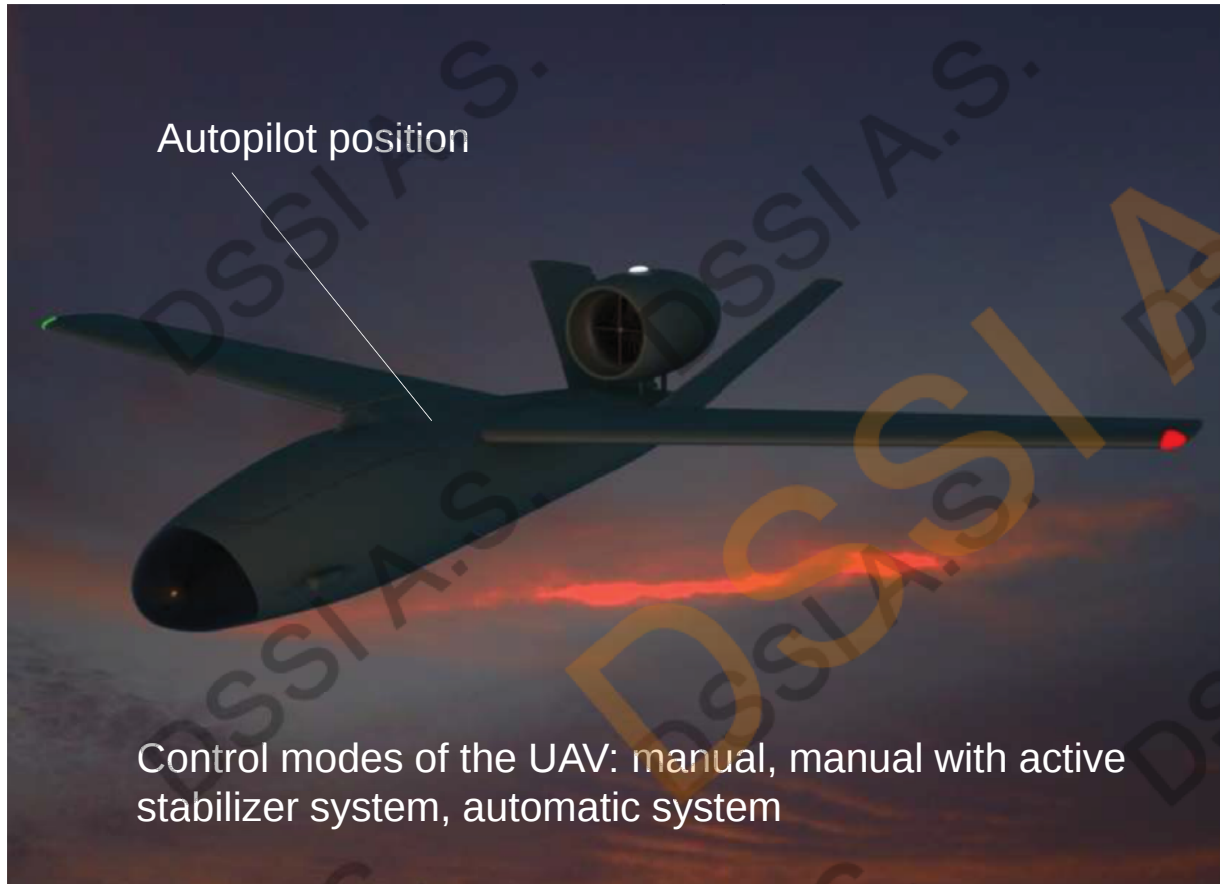
Model MS

Flight parameters

- Setting the landmarks of the flight (also during UAV flight)
- Automatic altitude control
- Control of the UAV flight to the ground
- Activation of circling at specified points of the flight
- Radius control of circling
- Automated return of UAV to a particular point
- Automated takeoff and landing of UAV
- Max. flight altitude – 3000 m
- Min. flight altitude – 300 m
- Max. flight speed – 400 km/h
- Min. flight speed – 120 km/h
- Weather conditions – high temperature, high humidity, other aggressive environment



Current R&D project: UAV - Model **MS**



The autopilot main parameters:

- Microcomputer control unit
- GPS (GLONASS)
- 3-axis MODE (MEMS gyro, MEMS accelerometer)
- 3-axis magnetic sensor, an accurate barometric pressure sensor
- The UAV position control algorithm
- The frequency of the internal management of UAV
- Position in space – 100 Hz,
- The navigation signals frequency of UAE– 10 Hz
- Controlled elements: rudder, elevator, ailerons

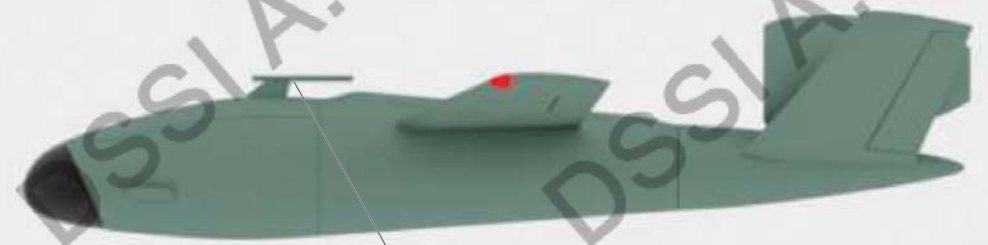
Navigation modes: controlled flight from the ground control station and the flight controlled by an UAV video sensor.

Current R&D project: UAV - Model MS

Telemetry data transmitted to the Ground Control Station and Communication System

- Supply and fuel consumption (voltage and battery current consumption)
- Received signal GPS (GLONASS)
- Position of UAV in the space
- Parameters for a virtual dashboard for UAV Ground Control Station
- Data from the payload (payloads data)
- Downlink Bandwidth 10 Mb/s
- Uplink Bandwidth 1 Mb/s
- Frequency Band 5150 – 5250 MHz

Aircraft Model MS



GPS antenna

Current R&D project: UAV - Model **MS**

Flight Control System installation requirements

- Aircraft shall be equipped with power supply for the FCS (10-30 DC, 300 mA) and for servos
- Aircraft servos shall be controlled by PWM (1-2 msec, 50 Hz)
- Flight control system shall be installed as close as possible to the center of the airframe gravity
- Data exchange with radio modem and turning antenna should be done through
- Ground Station shall be inbuilt to the computer with installed OS Windows





UAV

Unmanned
Aerial Vehicle

Research & Development
Project

Current R&D project: UAV - Model **MS**

Aircraft takeoff and landing

Takeoff is secured by mechanical
or pneumatical catapult, which
shall be mounted on truck trailer.

Landing is secured by parachute
system.





UAV

Unmanned
Aerial Vehicle

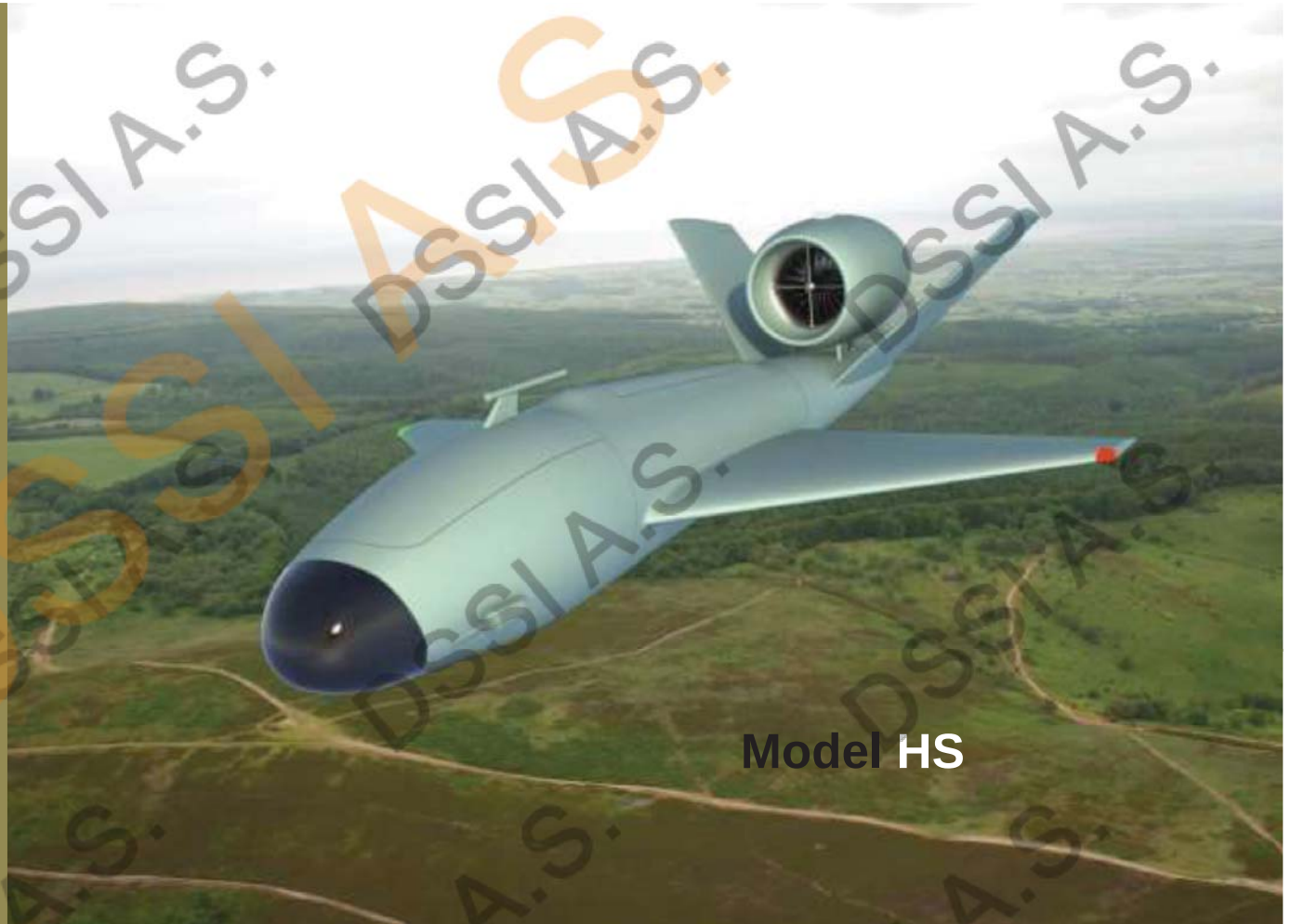
Research & Development
Project

Current R&D project: UAV - Model HS

Project target:

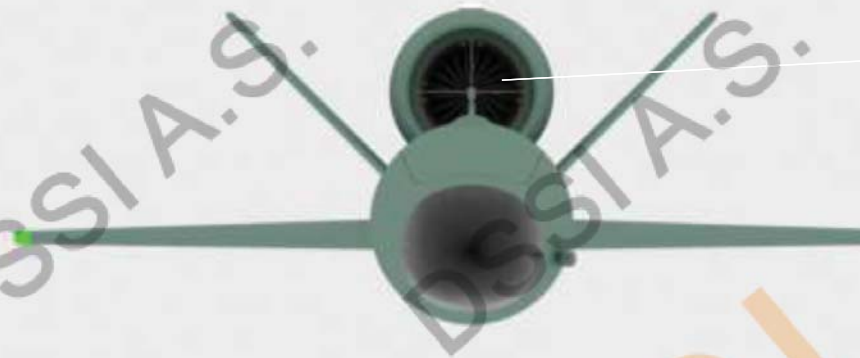
Development of middle
Unmanned Reconnaissance
Aerial Vehicle equipped with a
Turbojet engine - **Model HS**

The UAV is designed for
transsonic speeds (up to
800km/h at altitude of 8000m),
middle sized, intended for
reconnaissance, surveillance
or special applications. Flight
control system will be Auto,
Semi and Manual.



Model HS

Current R&D project: UAV - Model HS



Turbojet engine TJ100

Velká Bíteš (Czech Republic)



Aircraft parameters:

- Airframe configuration – classical
- V-tail type
- Length $L=4$ m
- Airframe body diameter $D=0,7$ m
- Wing span $W=3$ m
- Chord span $B=0,6$ m
- Takeoff weight 300 kg
- Payload weight 30 kg
- Engine type – turbojet engine TJ100
- Control surfaces – elevator, rudder
- Kill switch (cut off)
- Aircraft material – combination of graphite composites and aluminum alloy

Most parameters of UAV Models MS and HS are identical.



UAV

Unmanned
Aerial Vehicle

Research & Development
Project

Current R&D project: UAV - Model HS

Aircraft Model HS



Flight parameters

- Setting the landmarks of the flight (also during UAV flight)
- Automatic altitude control
- Control of the UAV flight to the ground
- Activation of circling at specified points of the flight
- Radius control of circling
- Automated return of UAV to a particular point
- Automated takeoff and landing of UAV
- Max. flight altitude – 8000 m
- Min. flight altitude – 300 m
- Max. flight speed – 800 km/h
- Min. flight speed – 200 km/h
- Weather conditions – high temperature, high humidity, other aggressive environment



UAV

Unmanned
Aerial Vehicle

Research & Development
Project

Current R&D project: UAV - Model HS

Visualization gallery



Possible future cooperation on UAV development:

- DSSI a.s. should develop and build for customer an UAV **MS** or Model **HS** on turnkey
- DSSI a.s. is open to cooperate on R&D of new UAV models with potential partners based on contract.



DSSI a.s.

Wolkrova 4

851 01 Bratislava

Tel.: +421 2 4820 3900

e-mail: gabriela.kunova@dssi.sk

www.DSSI.sk