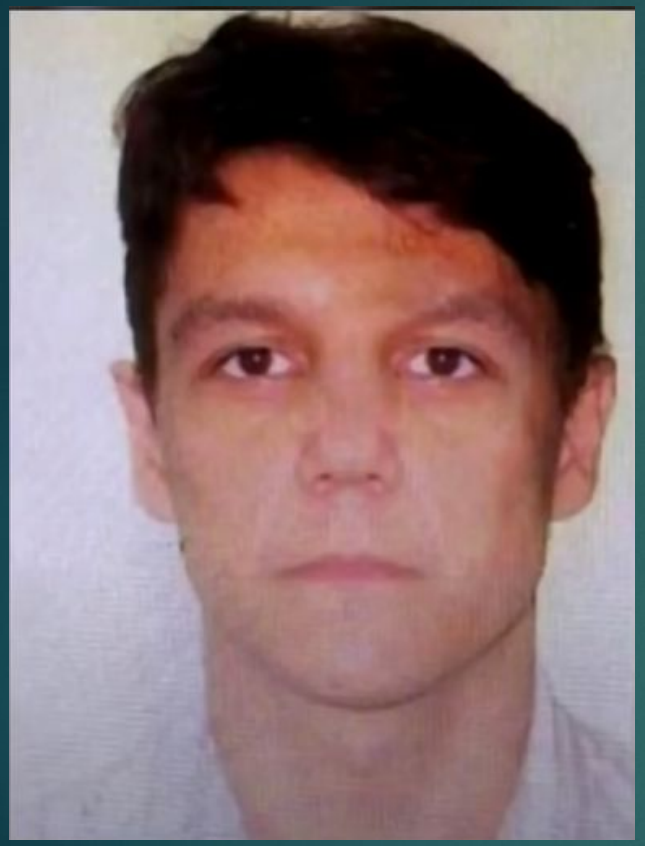
Презентация на тему: «Катастрофа Superjet 100 в Шереметьево»

ПРЕЗЕНТАЦИЮ ПОДГОТОВИЛ СТУДЕНТ ГРУППЫ БТП 3-1 ЯХОНТОВ АЛЕКСАНДР

On May 5, 2019, an Aeroflot Superjet 100 crashed while landing at Sheremetyevo Airport. The liner was flying on the route Moscow - MurmanskWhen returning to the departure airfield, the aircraft made several rough landings and as a result of the resulting fire received significant damage. 41 people died, 37 survived.

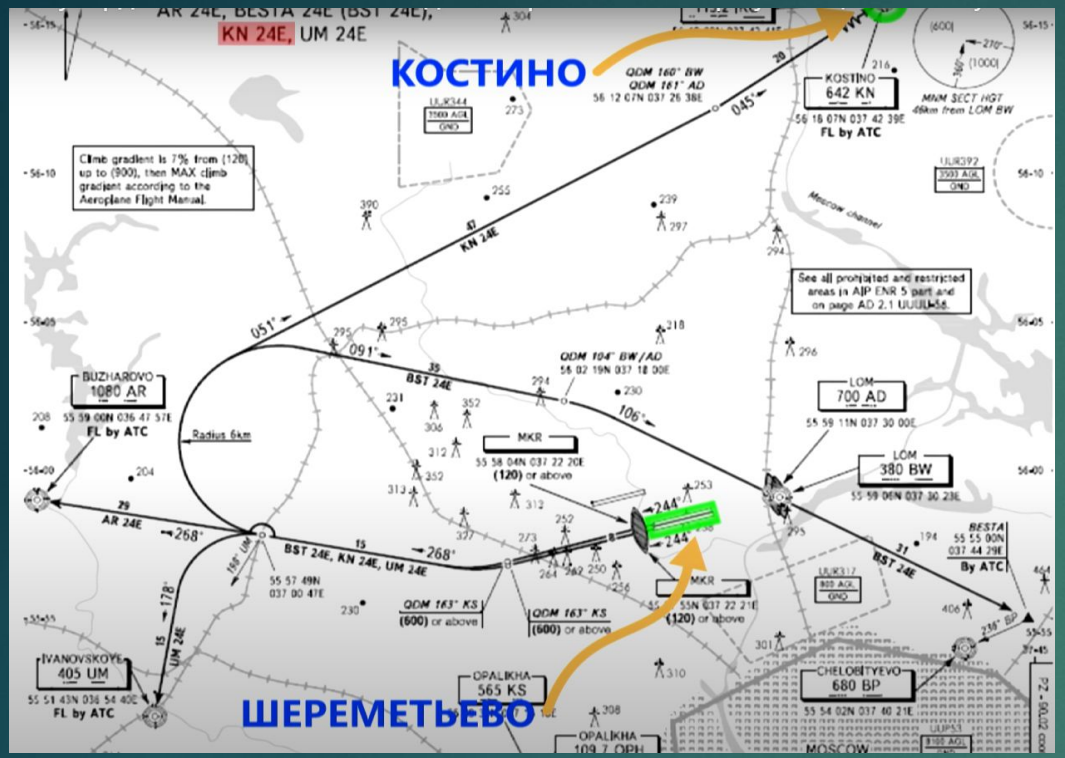
Chain of events



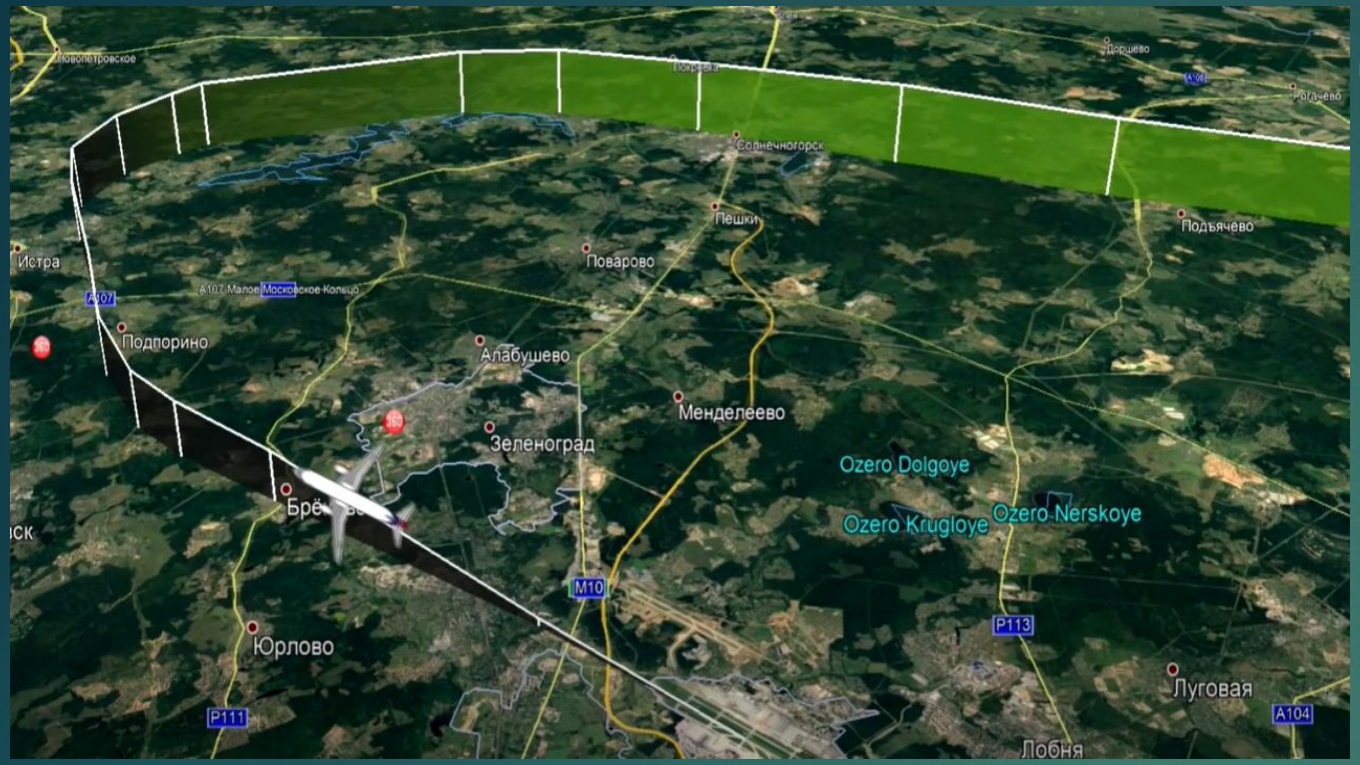
Denis Evdokimov (Pilot)
6800 flight hours.

- On May 5, the time is 17:17, the crew is preparing for departure to Murmansk.
- The commander of the liner, Denis Evdokimov, is 42 years old, he is an experienced pilot, he used to fly as a commander on the IL-76 and Boeing-737
- The co-pilot is 36 years old, and he graduated from flight school only 3 years ago and has been an Aeroflot airline pilot for six months.

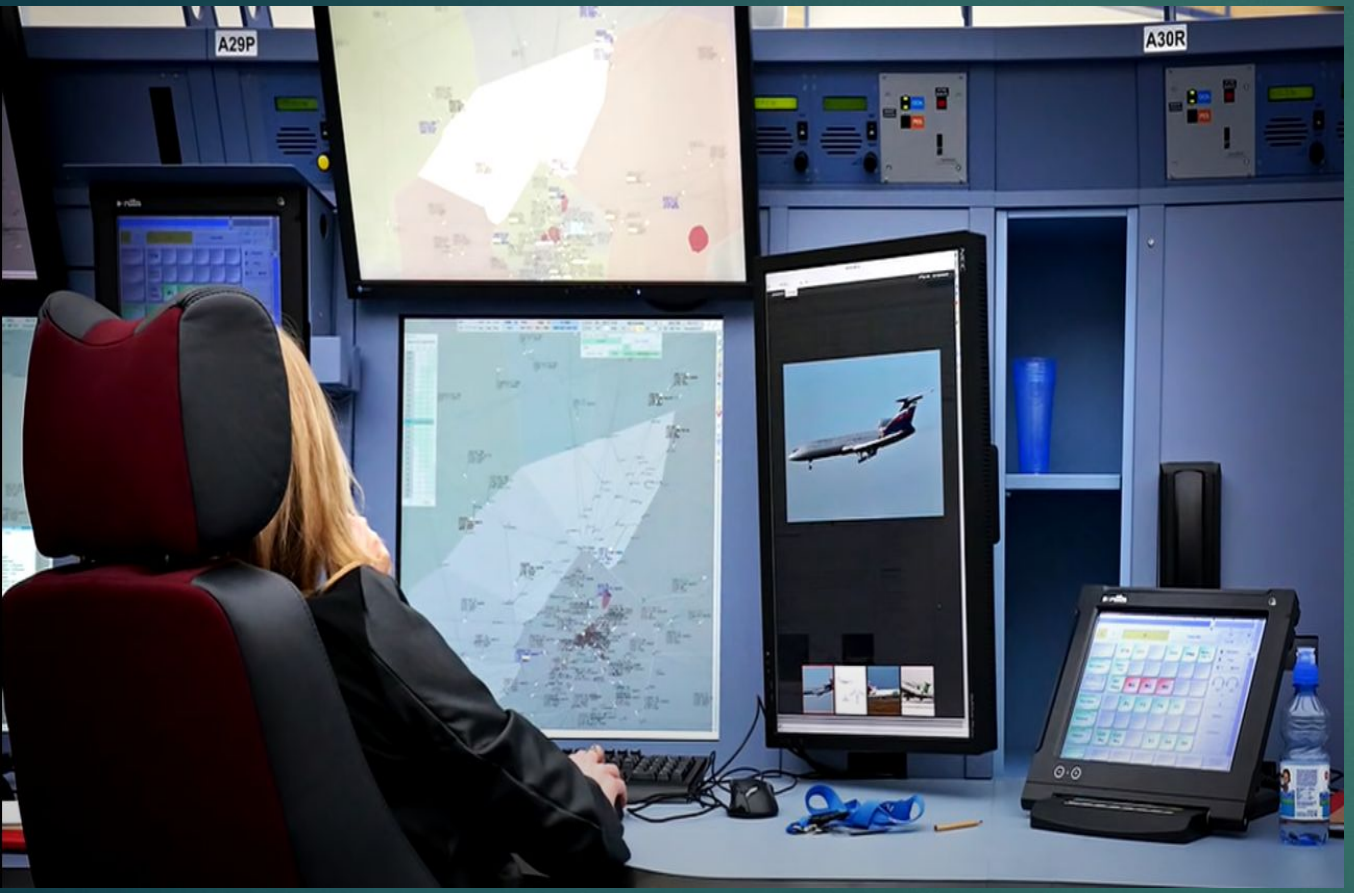
Departure scheme



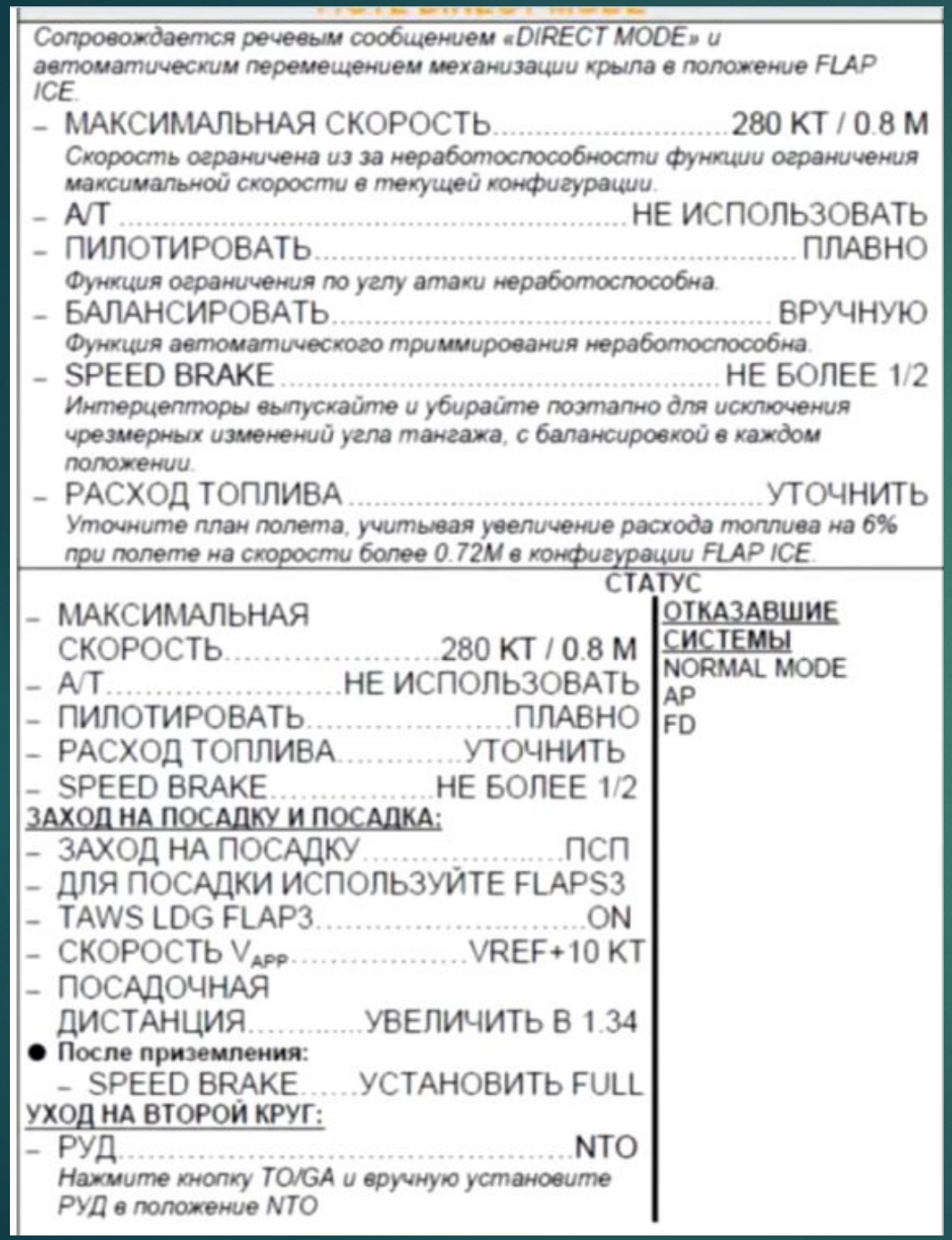
- Before departure, the dispatcher transmits weather data to the crew, in which a sufficiently large thunderstorm front is visible.
- At 17:57, the crew taxis to the runway, takeoff is allowed.
- At an altitude of 210 meters, the commander turns on the autopilot.



After half a minute, lightning strikes the plane, the autopilot turns off and the plane switches to direct mode (direct control) - one of the three regular flight modes of the liner. In this mode, the aircraft can only be controlled by a joystick (sidestick).



- After a lightning strike, the plane can continue its flight and there is no urgent need to return back.
- However, Denis Evdokimov decides to return to the airport immediately.
- Meanwhile, the co-pilot is trying to report the incident to the dispatcher, but due to a lightning strike, the radio station does not work.
- As a result, the crew manages to get in touch with the help of an emergency radio station and the entire further flight is carried out using the instructions of the dispatcher.
- The plane begins to descend.



Сопровождается речевым сообщением «DIRECT MODE» и автоматическим перемещением механизации крыла в положение FLAP ICE.

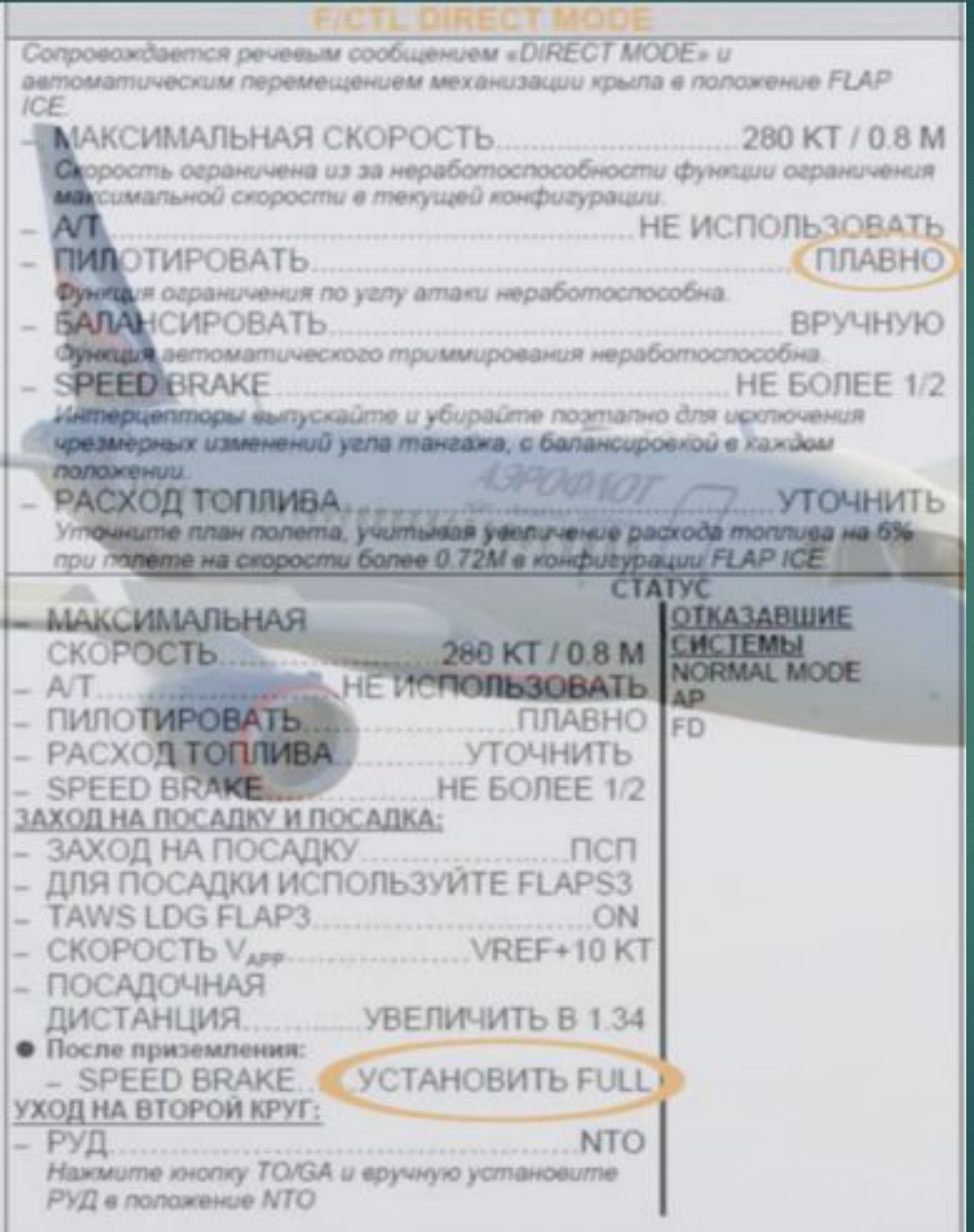
- МАКСИМАЛЬНАЯ СКОРОСТЬ.....280 KT / 0.8 M
  Скорость ограничена из за неработоспособности функции ограничения максимальной скорости в текущей конфигурации.
- A/T .....НЕ ИСПОЛЬЗОВАТЬ
- ПИЛОТИРОВАТЬ.....ПЛАВНО
  Функция ограничения по углу атаки неработоспособна.
- БАЛАНСИРОВАТЬ.....ВРУЧНУЮ
  Функция автоматического триммирования неработоспособна.
- SPEED BRAKE.....НЕ БОЛЕЕ 1/2
  Интерцепторы выпускайте и убирайте поэтапно для исключения чрезмерных изменений угла тангажа, с балансировкой в каждом положении.
- РАСХОД ТОПЛИВА.....УТОЧНИТЬ
  Уточните план полета, учитывая увеличение расхода топлива на 6% при полете на скорости более 0.72M в конфигурации FLAP ICE.

	СТАТУС
– МАКСИМАЛЬНАЯ СКОРОСТЬ.....280 KT / 0.8 M	**ОТКАЗАВШИЕ СИСТЕМЫ**
– A/T.....НЕ ИСПОЛЬЗОВАТЬ	NORMAL MODE
– ПИЛОТИРОВАТЬ.....ПЛАВНО	AP
– РАСХОД ТОПЛИВА.....УТОЧНИТЬ	FD
– SPEED BRAKE.....НЕ БОЛЕЕ 1/2	
ЗАХОД НА ПОСАДКУ И ПОСАДКА:	
– ЗАХОД НА ПОСАДКУ.....ПСП	
– ДЛЯ ПОСАДКИ ИСПОЛЬЗУЙТЕ FLAPS3	
– TAWS LDG FLAP3.....ON	
– СКОРОСТЬ V_{APP}.....VREF+10 KT	
– ПОСАДОЧНАЯ ДИСТАНЦИЯ.....УВЕЛИЧИТЬ В 1.34	
● **После приземления:**	
– SPEED BRAKE.....УСТАНОВИТЬ FULL	
УХОД НА ВТОРОЙ КРУГ:	
– РУД.....NTO	
Нажмите кнопку TO/GA и вручную установите РУД в положение NTO	

- The crew performs a checklist with a direct mod.
- At the same time, the parameter was specified – to pilot smoothly.
- Speed brake set to full after landing.

- The dispatcher allows the landing, but the commander asks for an additional flight in a circle.
- At this time, the pilot has an idea to go to the waiting area, but this message was not registered on the dispatcher tape recorder, the commander did not return to this issue anymore.
- The height is 600 meters, it is difficult for the commander to maintain it in manual mode.
- Deviations exceed 60 meters, this causes multiple triggering of the corresponding alarm.
- Chassis and flaps are available.

- The crew reinforces the air brakes (these are flaps on the wing that rise up).
- In reinforcement mode, when the landing gear touches the ground, they should automatically go up and thereby press the aircraft to the runway, but they are not automatically released in direct mode, and this is what the co-pilot said 9 minutes ago when reading the checklist.



F/CTL DIRECT MODE

Сопровождается речевым сообщением «DIRECT MODE» и автоматическим перемещением механизации крыла в положение FLAP ICE.

– МАКСИМАЛЬНАЯ СКОРОСТЬ ..... 280 КТ / 0.8 М

Скорость ограничена из за неработоспособности функции ограничения максимальной скорости в текущей конфигурации.

– A/T ..... НЕ ИСПОЛЬЗОВАТЬ

– ПИЛОТИРОВАТЬ ..... ПЛАВНО

Функция ограничения по углу атаки неработоспособна.

– БАЛАНСИРОВАТЬ ..... ВРУЧНУЮ

Функция автоматического триммирования неработоспособна.

– SPEED BRAKE ..... НЕ БОЛЕЕ 1/2

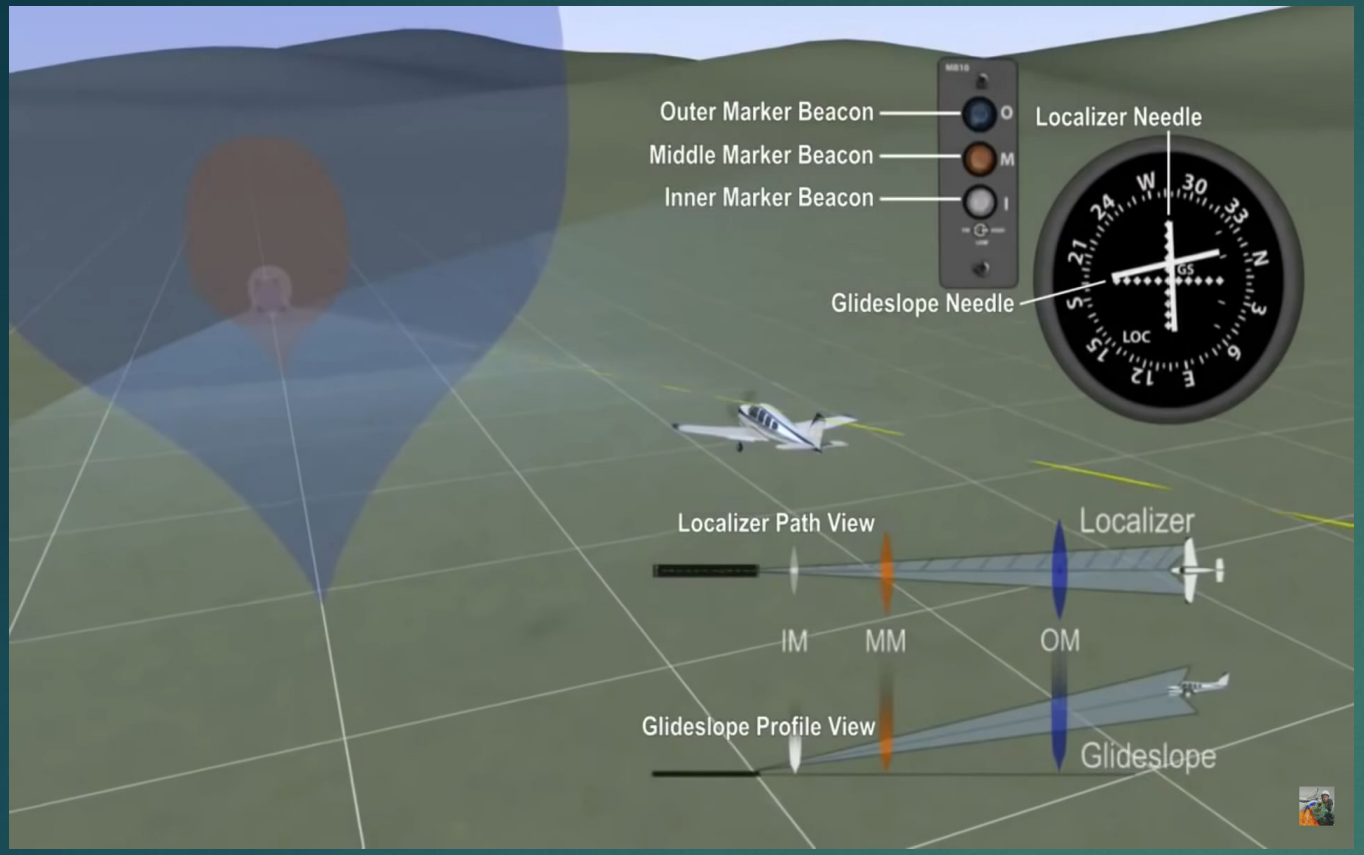
Интерцепторы выпускайте и убирайте поэтапно для исключения чрезмерных изменений угла тангажа, с балансировкой в каждом положении.

– РАСХОД ТОПЛИВА ..... УТОЧНИТЬ

Уточните план полета, учитывая увеличение расхода топлива на 6% при полете на скорости более 0.72М в конфигурации FLAP ICE.

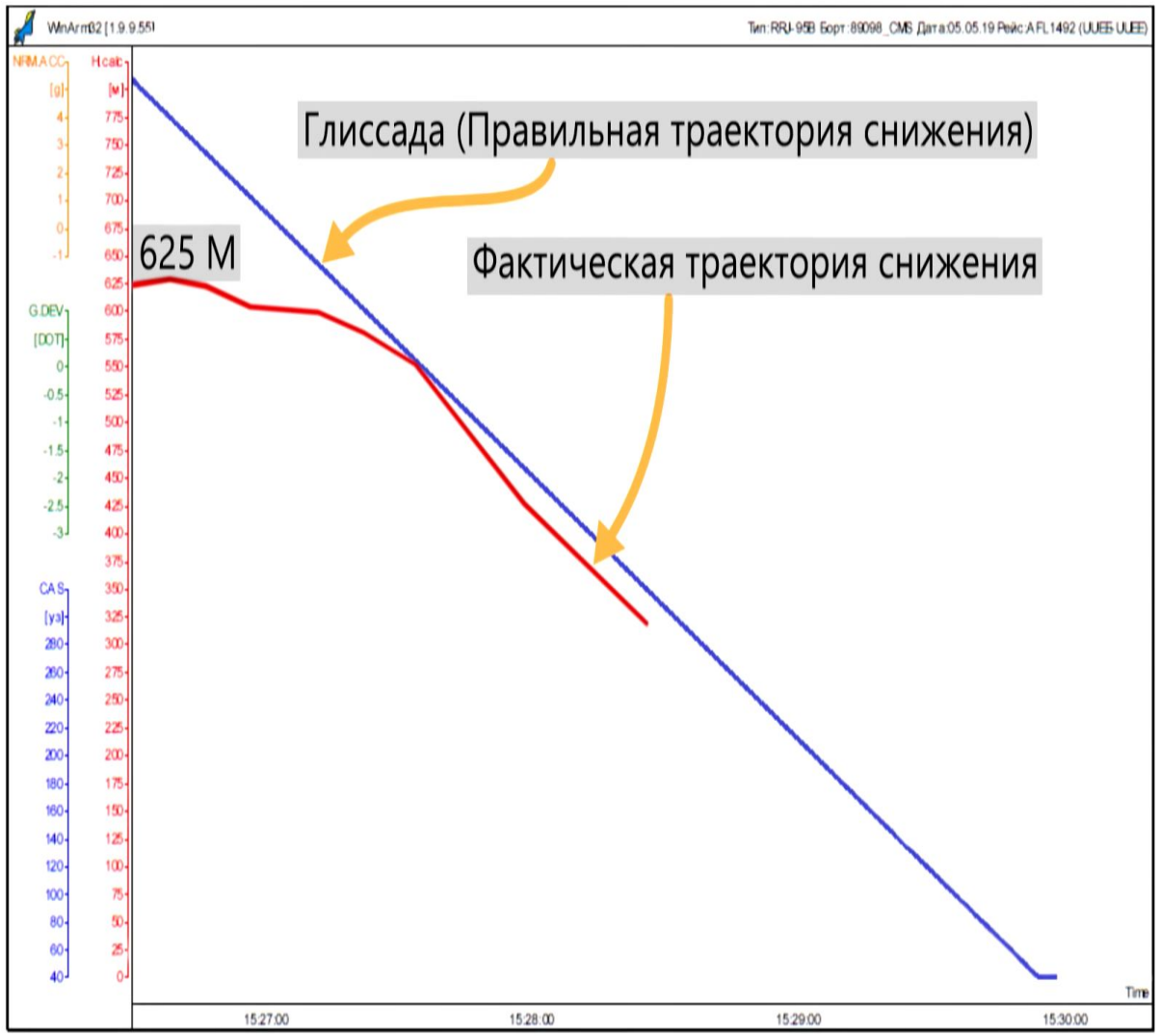
СТАТУС	ОТКАЗАВШИЕ СИСТЕМЫ
– МАКСИМАЛЬНАЯ СКОРОСТЬ ..... 280 КТ / 0.8 М	NORMAL MODE
– A/T ..... НЕ ИСПОЛЬЗОВАТЬ	AP
– ПИЛОТИРОВАТЬ ..... ПЛАВНО	FD
– РАСХОД ТОПЛИВА ..... УТОЧНИТЬ	
– SPEED BRAKE ..... НЕ БОЛЕЕ 1/2	
ЗАХОД НА ПОСАДКУ И ПОСАДКА:	
– ЗАХОД НА ПОСАДКУ ..... ПСП	
– ДЛЯ ПОСАДКИ ИСПОЛЬЗУЙТЕ FLAPS3	
– TAWS LDG FLAP3 ..... ON	
– СКОРОСТЬ V_{APP} ..... VREF+10 КТ	
– ПОСАДОЧНАЯ ДИСТАНЦИЯ ..... УВЕЛИЧИТЬ В 1.34	
● **После приземления:**	
– SPEED BRAKE ..... УСТАНОВИТЬ FULL	
УХОД НА ВТОРОЙ КРУГ:	
– РУД ..... NTO	
Нажмите кнопку TO/GA и вручную установите РУД в положение NTO	

- Missing checklist item



The only ILS view available with Directmode

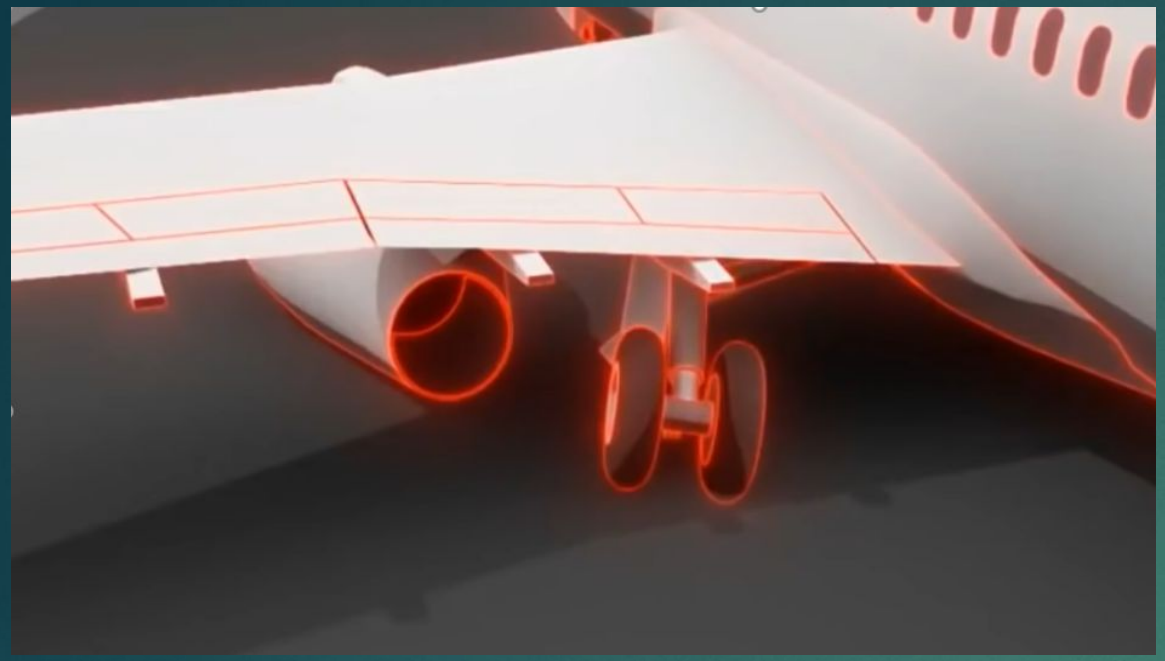
- 20 km before the runway, the dispatchers take the plane on a landing course.
- After 11 km, the entry point to the glide path, it is from there that the final descent to the lane will begin.
- When asked by the dispatcher about the type of approach, the crew replies that they will enter by ILS (instrumental landing system)
- Pilots read the map of control checks "on landing", but before that the crew does not perform the map of control checks "on approach".
- And there was something to discuss, if the commander had done it, then the co-pilot would have understood better what to do and how to help, in fact the crew is not ready to land.



- 9 km to the runway, the plane is descending, while the commander is deliberately going below the glide path.
- On the left, a strong side wind blows almost at an angle of 90 degrees with gusts up to 15 meters per second, which complicates the situation.
- The height is 335 meters, the wind shear alarm is working (go around, wind shear ahead), according to the instructions it is necessary to go for a second round, but if the commander is sure that there is actually no threat of wind shear, you can continue the approach. The commander ignores this alarm.

- The height is 80 meters, we urgently need to make a decision. At this moment, as the system warned, the wind changes dramatically, and the plane quickly falls under the glide path and begins to go below the set trajectory.
- In order to catch up with the glide path, the commander adds thrust, the engines accelerate, but not immediately, they need time for this. The speed is increasing.
- They pass the end of the strip at a height of 12 meters, which is much lower than the prescribed value.
- The speed is 305 km per hour and continues to grow.

- The pilot controls the joystick excessively sharply in extreme positions and because of this landing occurs with an overload of 2.55G - this is very rude.
- The air brakes themselves are not released due to the direct mode mode, so the plane does not press against the runway and jumps to a height of 1.5 meters, hitting the ground with an overload of 5.85G.
- According to international standards, the landing gear must withstand a maximum load of 3.75G, so they begin to collapse, but the fuel tanks are still intact, the liner again lifts off the ground already at a height of 5 meters, the reverse turns on, and the aircraft at a speed of 258 km per hour falls to the ground with an overload of 5G for the last time.



- The partially destroyed chassis finally breaks down and breaks through the fuel tanks, fuel spills and a fire starts. The dispatcher's command "emergency services to the lane" sounds.
- The plane turns to the left and stops, evacuation begins and after a minute the engines stop…

Thanks for attention!