How can a technical problem affect a flight?

A modern aircraft is a very complicated construction. It contains/consists of different systems which are used for correct and reliable aircraft operation. Moreover most aircraft systems have redundancy (backup/ secondary/ standby/ alternate systems) which can perform the same function. Modern airliners, for example, have multiple hydraulic systems, backup autopilot(s) and navigation systems, several sources of power, such as generators, APU, batteries, etc. So it increases flight safety. But still it is almost impossible to prevent all failures. If it happens pilots usually try to resolve or troubleshoot the problem during the flight and proceed to destination safely. But unfortunately, any minor technical issue can develop into a serious situation, it can lead to multiple breakdowns. So it will negatively affect aircraft performance, can cause difficulties controlling the aircraft and in the worst case it can lead to disaster/catastrophe/human loss. In addition I'd say that most technical failures are unexpected and so they cause stress for the flight crew and it also can have a great impact on flight safety.

- ***What are the most common technical problems in flight reported by pilots?***

Different kind of technical problem can happen on aircraft like/such as engine failure, pressurization or fuel system problems, loss of hydraulics, undercarriage issues, electrical fault, computer malfunctions and so on. Actually any system may fail.

- ***What are the main reasons for technical problems on board?***

Technical failures may be caused by different reasons. They may include structural damage, metal fatigue or operational errors. Also technical problems may result from manufacturing defects or due to terrorist actions. To minimize the chances/probability of technical failures pilots and technicians should inspect and maintain/serve aircraft properly. Besides pilots must monitor the operation of all aircraft systems and indication in flight.

- ***What are expected requests and actions of the crew in case of a technical malfunction?***

In such a situation pilots may require an emergency descent, change of the flight plan, diversion to the nearest alternate, priority approach and landing, forced landing or ditching. Of course, they will need technical support and emergency assistance upon arrival. Also the crew will need additional information about alternate airports, weather and runway surface conditions, available ground and airport facilities. Actually it depends on the stage of flight and the nature of the problem.

- ***What kind of technical problems can cause aircraft diversion?***

In case when the crew is unable to solve/troubleshoot the technical problem during the flight and reach the destination safely pilots will divert the aircraft to the nearest suitable airdrome. It may happen due to engine or electrical failures, fuel system problems, loss of pressurization or hydraulics and so on.

- ***What kind of technical problems can cause an aircraft return to the departure aerodrome?***

If the crew face(s) a technical difficulty just when airborne or the aircraft isn't too far from the departure airport they will come back. Such situations are mainly connected with non-retracted landing gears, engine problems and etc.

- ***How dangerous is the situation on board in case of an engine failure?***

Engine failure can be really dangerous for aircraft especially for a single-engine one. The aircraft can lose power, level and speed very quickly so become uncontrolable. Also pilots may face/have problems with pressurization, air-conditioning, hydraulic, electical and other systems.

- ***How serious is a situation on board in case of an electrical system failure?***

Electrical failures can be very hazardous in flight because many other systems and devices may be affected. For example the crew may lose navigational, communication systems, flight management computers and so on.

- ***How dangerous is a situation on board in case of a hydraulic system failure?***

Due to hydraulic system failures pilots may experience problems with flight controls, extending and retracting landing gears or flaps, also difficulties with a braking and steeering systems. It can lead to RW excursions with futher nagative consequencies, like a blocked RW, structural damage of the aircraft, fire, medical problems and so on.

- ***What kind of of technical problems are assessed as an emergency?***

Any situation when we have/expect a threat for the flight safety and people's lives is an emergency. It may be engines losing power, total electrical system failure, loss of pressurization or hydraulics and so on.

- ***How can a controller assist a pilot in an emergency?***

To remember the immediate actions and sequence of actions controllers should follow the Eurocontrol checklist/principle to ASSIST. In general, controllers must do their best to help pilots and provide safety.

- ***What are the best principles of ATC assistance to the pilot in distress?***

The best principles include the following elements:

A S S I S T

- **A**cknowledge the call; exact nature of the emergency: get the squawk.
- **S**eparate the aircraft from other traffic. Give it room/space to manoeuvre.
- **S**ilence - on the frequency. Provide separate frequency where possible - this prevents unnecessary clutter for the pilots. (impose a radio silence)
- **I**nform those who need to know and those who can help; inform others as appropriate.
- **S**upport the pilots in any way possible – provide with all needed information: weather and RW conditions. Start to think of alternative routings, for example short cut.
- **T**ime - give the pilots time to collect their thoughts, don't press them for information. Time produces good decision.

- ***What arrangements are needed on the ground for successful landing?***

For successful landing of an emergency aircraft the controller should (keep) clear the RW from departing, arriving aircraft and also from any vehicles, stop all the operations in the maneuvering area. The supervisor alerts appropriate emergency services and the ground staff. As for the ground staff they should prepare/ arrange necessary towing devices/equipment and an isolated parking stand/position.

- ***What services are normally alerted in case of an emergency landing?***

According to the rules we alert the fire brigade/service, medical services, the ground staff, security and police, a search and rescue team. We also inform airport and airline authorities

- ***What kind of special vehicles should be required in case of emergency landing?***

After landing the pilot may need towing trucks, tractors or a tow bar for his type of aircraft, a follow-me-car, fire vehicles, an ambulance and additional/special passenger steps.

- ***Have you ever had/heard of a situation connected with a technical problem?***

Yes, I have had such cases and not once. Several times Sukhoi Superjet100 reported electrical system issues and requested additional time to check. Also I handled aircraft with minor engine problems. Fortunately, all of them didn't require special assistance, they didn't take much time and ended well.