Risk Analysis

The use of a zeppelin airship to deliver internet connection poses a number of dangers that must be carefully analyzed and mitigated in order to assure the airship's reliability and safety. Our risk analysis outlines the potential challenges and their impact on the successful operation of the airship.

Risk Analysis

1. Financial Risks

During the design and development of the airship, there might be a cost or budget overrun. Overspending can cause financial strain and eventually project termination.

Risk Analysis

2. Technical Risks

System Reliability: Components can malfunction leading to a loss of internet connectivity, services and potential customer dissatisfaction.

Components Damage Challenges: At high altitude at about 20 km, low temperatures can affects the electrical components and electronics which is a great risk to good internet connection.

Helium Containment and Leakage: Helium can leak due to structural issues, wear, tear or manufacturing defects. Loss of helium can affect buoyancy.

Flammability and Combustion Risks: Helium is non-flammable but presence of other combustible material poses a risk leading to safety hazards and total failure.

Risk Analysis

2.1 Structural Risks

Material Fatigue: Continuous Stress on airship's structure may lead to material fatigue over time causing structural failure and compromised integrity.

Payload Capacity Loads: Exceeding payload capacity may strain the structure causing deformation.

Corrosion: Exposure to harsh environmental conditions may lead to corrosion of structural components leading to weakening of the structure.

External Environmental Impacts: Collisions with birds or other external objects can cause structural and operational damages.

Risk Analysis

2.2 Aerodynamic Risks

Turbulence: Turbulence or strong winds may make it difficult to maintain stability, increases fuel consumption. This can show difficulty in navigation and control.

Aerodynamic Instability: Inherent aerodynamic instabilities affecting the airship's flight dynamics.

Altitude and Propulsion: Fluctuations in altitude and pressure can cause poor internet service and connection. Propulsion failure.

Ice Accumulation: At such high altitudes ice can accumulate on the surface of the body disrupting aerodynamics and increasing drag.

Risk Analysis

	Risks		Mitigation
T1	Technical Risks	System Reliability	Regular maintenance and testing
T2		Weather	Weather monitoring & robust weather-resistant material
T3		Helium Leak	high quality materials, regular inspection, technology
T4		Flammability	strict protocols, fire suppression system
S1	Structural Risks	Material Fatigue	choice of material, durable materials and testing
S2		Payload Capacity	payload sizing, selection of payloads
S3		Corrosion	protective coating
S4		External Impact	detection technology
A1	Aerodynamic Risks	Turbulence	robust aerodynamic design to minimize turbulence
A2		Instability	stability monitoring, adaptive control systems, no-fuel prop.
A3		Altitude and Propulsion	pressure sensors, maintain thrust of propulsion system
A4		Ice Accumulation	anti-icing systems, automated de-icing mechanisms
F1	Financial Risks	Budget Overrun	allocate budget, use of existing technology

Risk Analysis

Probability/Impact	1	2	3	4	5
1	1 (S2,S3)	1	2	3	5
2	1	2	3 (S1)	5 (A2)	8
3	1	2	4 (T2)	7 (S4)	10 (A4)
4	2	3	5	8	11
5	2	3	6 (T3, A1)	9 (T4, F1)	12 (T1,A3)