What is an Executive Summary?

The Executive Summary is a one-page document that summarizes the purpose, goals, and approach of your design project. Reading this summary should give any evaluator (or your boss) a clear idea of the problem you are tackling, your approach to solving it and roughly where you are in the process. Consider it an abstract or overview of your project.

You will initially build off your mission statement to write the executive summary in TC 2, but will edit and update the executive summary in all subsequent cycles. Early drafts of the executive summary will discuss your objectives and strategy and forecast work you plan to do. In your final report, the executive summary will be in past tense, summarizing your report and describing what your project entailed and its outcomes.

Two examples of executive summaries follow. The first is for a proposal, but still illustrates the principles of this type of document. The second is an executive summary submitted by a past BIOE design team.

Executive Summary Example #1

Copied from: Lumsdaine, Lumsdaine and Shulnett, Creative Problem Solving and Engineering Design, McGraw Hill, 1999

Executive Summary

Proposal to Design a Pedestrian Bridge
over Freedom Boulevard at Morningdale Avenue
Pumpkin Center, North Carolina

The firm of Acme Engineers and Designers proposes to design the subject pedestrian bridge at the request of the design sponsors, the City of Pumpkin Center and the North Carolina Department of Transportation. The need for this structure comes from three sources:

Comment [DJA1]: Team mission statement.

- Numerous citizen requests to the city council for a pedestrian route which shortens the average I-mile walk to the nearest overpass across Freedom Boulevard
- Several fatalities in the past two years occurred when pedestrians attempted to cross Freedom Boulevard between intersections
- An independent random survey of 250 citizens of Pumpkin Center by ACME engineers shows that 78% would support a modest tax levy to assist in building the bridge

Acme Engineers' initial concept for this bridge addresses the constraints imposed by the City of Pumpkin Center and the NC Department of Transportation, including:

- Accommodation of pedestrian traffic only
- Chain-link (or alternative) enclosed pathway on bridge
- Design meets all applicable codes and statutes

Comment [DJA2]: Needs and constraints.

Acme's survey of 250 Pumpkin Center citizens and two focus groups of potential users have identified the following design objectives listed in order of importance to these users:

- Safety in entrance and exit areas as well as on bridge pathway.
- Clear visibility of users (also a safety concern).
- Accessibility of entrance and exit areas to connecting sidewalks.
- Attractiveness of structure.
- Low cost.
- Low maintenance costs to maintain safe and attractive structure.
- Low susceptibility to vandalism and graffiti.

Comment [DJA3]: Design objectives

Our initial design concept, an attractive suspension-style structure, addresses each of these objectives while meeting the constraints imposed. Our proposal is to explore this and other similar concepts to develop a design that optimally satisfies all of these objectives. The design will be evaluated with computer simulations of 100-year wind loads and earthquake levels. Models of the alternative concepts will be constructed for evaluation by focus groups for attractiveness and accessibility prior to selection of final concept. The design will be conveyed to sponsors by interim and final reports, including the scale models.

Comment [DJA4]: Strategy

Comment [DJA5]: Plan and project status.

Executive Summary Example #2

Executive Summary

Designing a Microgravity Fracture Healing Device

High Performance Ninjas (HPN) will design the Osteonexus™, a microgravity fracture healing system. This system will address NASA's concerns regarding fracture risk during long term space travel, such as the 2-3 year mission to Mars planned for 2030. The needs for this device are as follows:

Comment [DJA6]: Mission statement

- Bone loss from long-term microgravity situations may significantly increase the risk of fracture
- Microgravity environment may severely inhibit or hinder normal bone healing mechanisms
- Long transit time to Mars rules out current ISS fracture protocol of splinting and returning to Earth
- Increased rate of healing allows for quicker return to normal operational capacity

Space travel is a highly complex endeavor. Consequently, the Osteonexus must adhere to additional constraints unrelated to its ability to heal fractures, which include:

- Limited medical expertise onboard shuttle
- No electrical interference with existing components on board the space shuttle
- Limited energy resources
- Limited space availability due to small working and living conditions on board the space shuttle
- Minimal weight due to the high cost of sending items into space

Comment [DJA7]: Needs and constraints.

After consulting with NASA and experts in fracture healing and bone biomechanics, several design objectives were identified and are listed below in order of importance:

- Effective fracture fixation and healing
- Ease of use with minimal medical training
- Versatility to multiple long bones
- Minimization of pain
- Maximization of mobility during treatment
- Small size and low weight

Comment [DJA8]: Design objectives

On Earth, different types of fractures require different treatment methods. This principle remains true when treating fractures in space. Thus, the Osteonexus is a system of devices that utilizes casting or external fixation in conjunction with ultrasound, electromagnetic fields, or micromovement therapies. The use of the Osteonexus is guided by a treatment logic chart. As ultrasound and electromagnetic field devices are commercially available, HPN will focus its efforts on designing a micromovement component. This component will use external fixation to secure the fracture and motorized axial dynamization to induce micromovement at the fracture site. The applied micromovement will mimic partial load bearing, which has been proven to help heal bone fractures on Earth. Such a device is necessary as a fracture would jeopardize the life of an astronaut and the objectives of a mission.

HPN has constructed a preliminary aluminum prototype for the Osteonexus Active Dynamizer and will be testing it in Spring 2006. We are currently devising a fracture evaluation system that will assess the effectiveness of bone healing by monitoring stresses on the prototype. Frequency and finite element analyses will also be conducted to characterize the device. The design of the Osteonexus will be improved and modified throughout the testing, and the final device will be made of plastic to reduce the weight.

Comment [DJA9]: Strategy and plan.

Comment [DJA10]: Project status.