Flying High

CROSS-SITE DESIGN CHALLENGE VOLUNTEER GUIDE

Total Time: 3 hours

Overview

Academy participants from different cities will work collaboratively in teams of about 4 as industrial engineers contracted by the management of Riverside International Airport (RTA), a regional international airport serving both domestic and international flights, to provide system design proposals to alleviate current peak congestion and help plan for expected future demand.

Objectives

Participants will:

- Engage in a hands-on engineering design challenge.
- Develop social and emotional skills, particularly reflection, assertiveness, and active engagement.
- Demonstrate greater engineering awareness particularly related to the work of industrial engineers.
- Demonstrate employability skills, particularly people skills, communication skills, self-management skills, and thinking skills.
- Demonstrate the engineering habits of mind, particularly, systems thinking, problem-finding, and optimizing.

Challenge details

- This challenge is open to all current and past Next Engineers Academy participants.
- The challenge will be offered on the 28th March 2026 (subject to sufficient registration) starting at 9am EST | 1pm GMT | 2pm CET | 3pm SAST.
- Teams will collaborate via **Zoom**.
- During the final 20 - 30 minutes, teams will present their design proposals to you, the CEO of the Riverside International Airport.

Design brief

Teams will respond to the following brief in the form of a **5 – 10 minute** virtual presentation to you, the CEO of Riverside International Airport.

> *Your team has been asked to assist with the design of systems, processes, passenger flows, and internal terminal layouts to reduce current peak congestion and allow the airport to accommodate future expected capacity demands.*
>
> *Below, you will find data about current capacity and operations that RTA has compiled for you. Use these data to:*
>
> - *Investigate current operations and identify the most important bottleneck(s).*
> - *Propose system, processes, flow, and layout changes that improve throughput and reduce peak congestion, bringing it in line with airport target wait times, while also accommodating expected future demand as far as possible.*

You may make any reasonable assumptions where needed, so long as these are clearly stated and justified.

At the end of the time, you will present your proposals to the CEO of the airport. You may present your thinking in whatever form you choose. For example, you could create a slide deck, a document, a Canva poster, an infographic, a flow chart, or anything else you think will help you communicate and explain your ideas.

You will have 5 – 10 minutes for this presentation.

NOTE*: Your task is NOT to design buildings or aesthetics, and you are not (re)designing the whole airport.*

Open the full Student Guide to see:

- The current capacity and operations data compiled by RTA
- The analysis framework provided to students
- An assumptions bank restricting certain assumptions to ensure they remain grounded in reality

Volunteer roles

As a GE volunteer, you can support and add enormous value to this challenge in either of the following ways:

- **Participate in the full session** and move virtually between teams to offer guidance, support, insight, and assistance as required *(2.5 - 3 hour virtual commitment).*
- **Play the role of the RTA CEO** to whom teams will present their design proposal, asking questions, interrogating their thinking, and providing feedback. See the **evaluation guide** below to assist you in rating each presentation on a set of criteria *(30 minute virtual commitment).*

Evaluation guide

Here are some of the things you should look out for in team presentations.

- The team has identified at least one primary bottleneck and is able to justify their choice in ways that go beyond the "known issues" list e.g., students state "security is the bottleneck because queues are long" without quantifying this in any way.
- The team includes at least 4 – 5 relevant calculations based on the data provided and reasonable assumptions.
- The team makes their assumptions explicit, and these are reasonable and justified.
- Where very optimistic assumptions are made, these are made without acknowledging the inherent trade-offs.
- The team explicitly tests assumptions and identifies failure modes.
- The team compares conservative/reliable vs optimized/fragile operation.
- The team recognizes at least one trade-off or secondary effect.
- The team identifies emerging secondary bottlenecks or knock-on effects.
- The team does a future capacity check.
- The team acknowledges where design proposals may not meet 2034 demand alone but makes next-step recommendations.

Suggested CEO review questions

Here are some questions you can ask to help you probe and evaluate student presentations and their response to this design challenge.

- System understanding:
  - Why did you choose this bottleneck over the others?
  - What part of the system did you deliberately not optimize, and why?
- Quantitative reasoning:
  - Which assumption(s) matters most to your design's success?
  - What happens if your throughput assumption is 20% too high?
- Trade-offs & risks management:

- o Where does congestion move if your proposal works perfectly?
- o What makes your solution fragile under real-world conditions?
- Future capacity:
  - o Does this design meet the 2034 targets on its own?
  - o If not, what would you do next if given more time or budget?
- Implementation reality:
  - o What would be hardest to implement operationally?
  - o Which stakeholder (passengers, staff, airlines) might resist this change?