UCL MSC Communications Programmes ITN review and assignment seminar

Professor Izzat Darwazeh

Professor Miguel Rio

06 November 2020

11.00 to 12.30

- What has been learnt? Your answers
- Fundamentals
  - Modulation, Digital, Sampling
  - Error rates
  - Transmission
    - Wireless
    - Optical fibre/wired
- Networks
  - WAN, MAN,LAN
  - Routing, Intra Inter
  - OSI
  - TCP/IP
  - Switching
  - Transport TCP and UDP
  - Connectionless and connection oriented
  - Resilience
- Applications
  - IoT
  - Multimedia
    - Source coding
    - Channel coding

–Road distances:

–from the south eastern tip (existing sub sea cable landing pint) to Maintown: 10 km

–from the north western tip (new sub sea cable landing pint) to Maintown: 35 km

–from the north western tip (new sub sea cable landing pint) to Maintown along the northern coastal route: 55 km

–

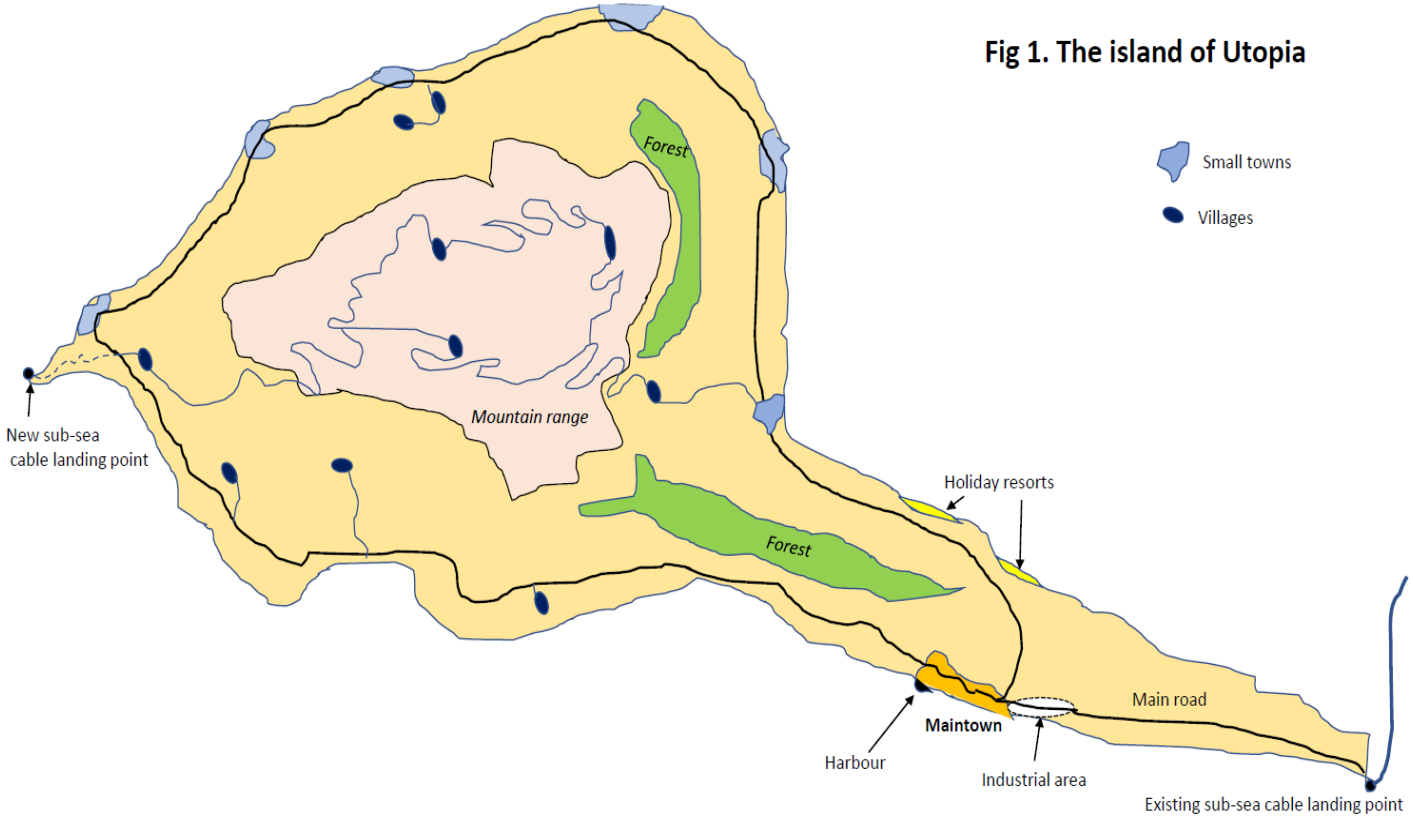

Fig 1. The island of Utopia

The general setup

- In particular, the Government wants to do the following:
- 1- turn the largest town into a smart city;
- 2- improve broadband access, especially in the rural areas;
- 3- modernise the mobile network (currently only 2G/3G); and
- 4- improve connectivity to the outside World.

The Questions

–EXEC summary, link all topics of your answer and link to network modernisation plan.

–Your report needs to address (briefly) the overall network modernisation plan and address in more detail **only four** of the six sub-projects below:

–

–Upgrade of Core transport network (the transmission links between towns)

–Introduction of a new separate sub-sea cable landing point.

–Introduction of High-speed broadband access.

–Introduction of 5G mobile.

–The design of the IP network(s), considering two aspects:

– i) the network technology, considering plain IP or IP with MPLS, and

–ii) the design of at least two autonomous systems, including their addressing and how they interconnect and exchange inter-domain routing traffic.

–Conversion of the Maintown to a smart city that requires the design of the IoT system, knowing that the government is interested in:

– i) smart buildings with optimised energy consumption, and

– ii) security cameras around the city. Outline what types of sensors, types of connectivity and types of data analytics are needed for each of the two goals. Comment on the pros and cons of using the cloud for video content.

- **Your assignment answer should be in your own words, with appropriate use of charts and figures in a document of no more than 11 pages in length; one page must be the assignments "Executive Summary". For the document use minimum font size 12 and 2.54 cm margins all around. Any diagrams or wording taken from external sources must be clearly identified and referenced.**

- Assignment to be handed in by: 12.00 Monday 23 November 2020.
- Submissions should be no more than 11 pages in total length (not including cover page, tables of contents, tables of references and appendices), with font size no smaller than 12pt.

- It is extremely important that all sources of information are properly credited and referenced. The inclusion of any figures or diagrams from web sites or documents must be contain a reference to the original source in the figure caption. You are strongly advised to adhere to a standard referencing format, such as Harvard, IEEE or Vancouver format. The reference list is not included in the page count.

How we will mark..

- There are four sub-projects to be chosen from a list of 6. Each one of these will have 25% of the mark. For each of these sub-projects, marks distribution will be as follows:
-
- Research and use of references
- [20% of total sub-question mark]
-
- Technical argument and justification of design decisions; depth and clarity of argument and understanding
- [60% of total sub-question mark]
-
- Presentation, logical flow text, organisation of material, use of supporting evidence, sketches, diagrams etc.
- [20% of total sub-question mark]
-
- In the case of each of the questions we will be looking for commentary and design ideas that address some or all of the technical aspects and where appropriate take into consideration aother engineering and economic/cost/social aspects.