

Two hours

Please use a ruler for diagrams and tables

**UNIVERSITY OF MANCHESTER
DEPARTMENT OF COMPUTER SCIENCE**

Systems Governance

Date: Monday 20th January 2020

Time: 09:45 - 11:45

**Please answer all THREE Questions
Each Question is worth 20 marks**

**Do NOT use one-word answers or use lists without an explanation of each element in the list
No marks will be awarded for reproducing answers to similar questions from previous years**

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This is a CLOSED book examination

The use of electronic calculators is NOT permitted

1. RESPONSIBILITY AND ACQUISITION

a) Explain the six elements of systems governance.

(6 marks)

b) Some people try to escape paying fines for speeding – and other motoring offenses – by claiming that they weren't at the wheel. So, the Home Office has commissioned a new system – Driver Identification after Motoring Offence using Numerous Databases (D.I.A.M.O.N.D.) – to provide evidence of who was driving. It is also to showcase joined-up government and shared services. The objective is to positively identify the driver at the time of the offence beyond reasonable doubt.

When a speeding car trips a forward-facing speed camera, the photograph of the driver's face is analysed biometrically. The result could be compared to the photographic record held by DVLA (cross referenced to the details of the registered owner). If no photographic driving license is held, or the suspect is not the registered owner, D.I.A.M.O.N.D. could search for an identifying photographic record at (say) the Identity and Passport Service. If no photographic record at Identity and Passport Service, D.I.A.M.O.N.D. may search for a photographic record of Foreign Nationals held by Home Office. When a matching photographic record is found, a report is sent to the local authority who manages the area where the speed camera is housed. Reports are reviewed to ascertain to whom the penalty notice should be sent. The resources that will be available to solve the problem may include – but not be restricted to those shown in Figure 1 below:

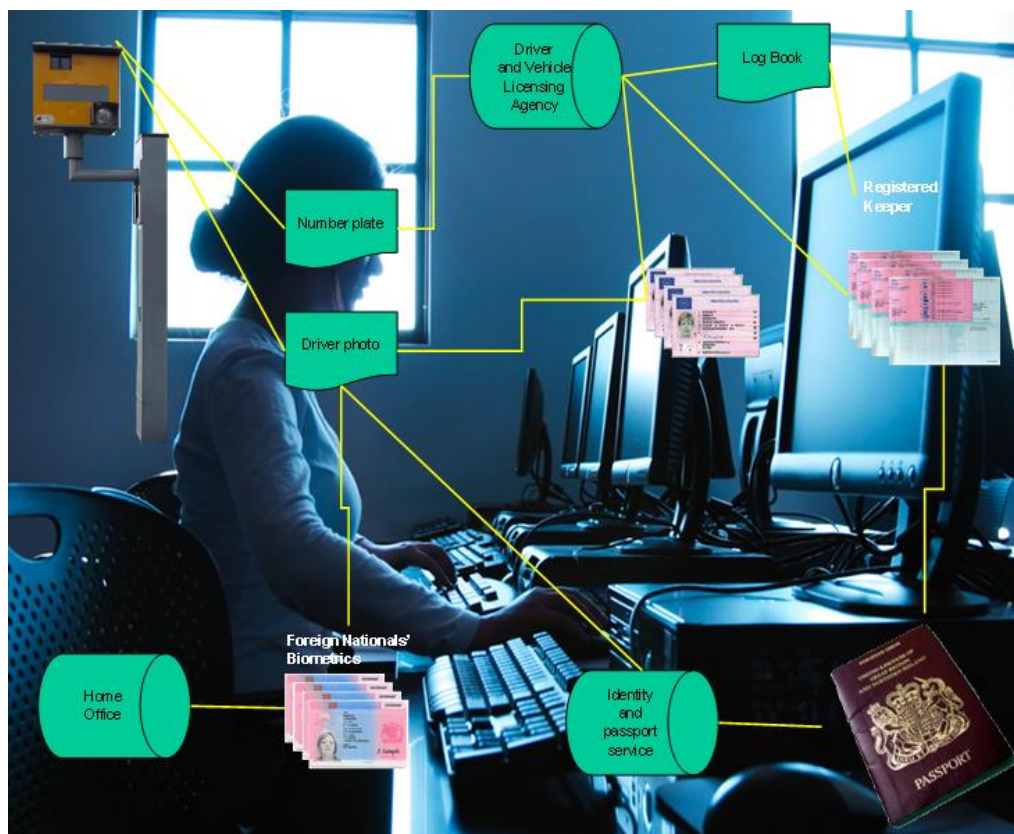


Figure 1: D.I.A.M.O.N.D.

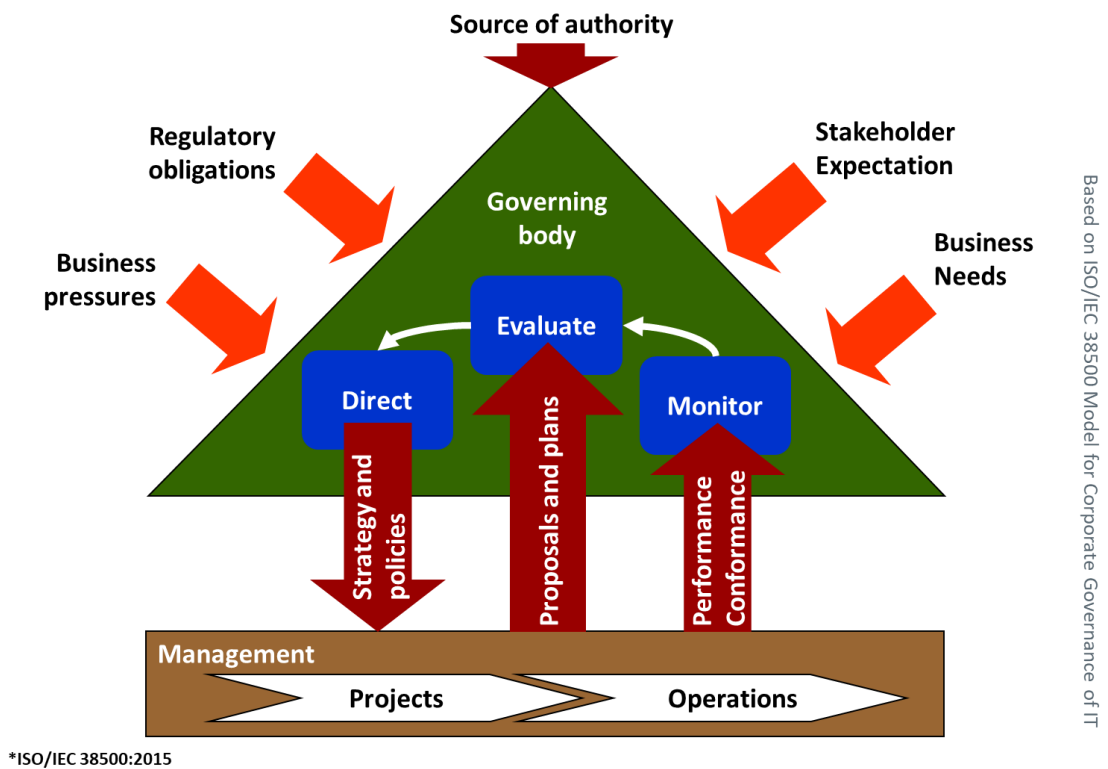


Figure 2: Governing systems

Apply the ISO/IEC 38500 governance process (Figure 2) – and the 6 elements to D.I.A.M.O.N.D.– and write an outline plan to show how the collaboration between stakeholders could work to deliver a viable system that will deliver its objectives.

(14 marks)

2. ARCHITECTURE/STRATEGY

a) Explain the role of the reference architecture in Systems Governance.

(6 marks)

b) RAMPARTS (Figure 3) – ReAl-time Mobile monitoring of Patient symptoms, Access to Records, Treatment, and Storage – is an information system that processes and stores medical information about individuals and supports medical practitioners in their decision making and administration of treatment.

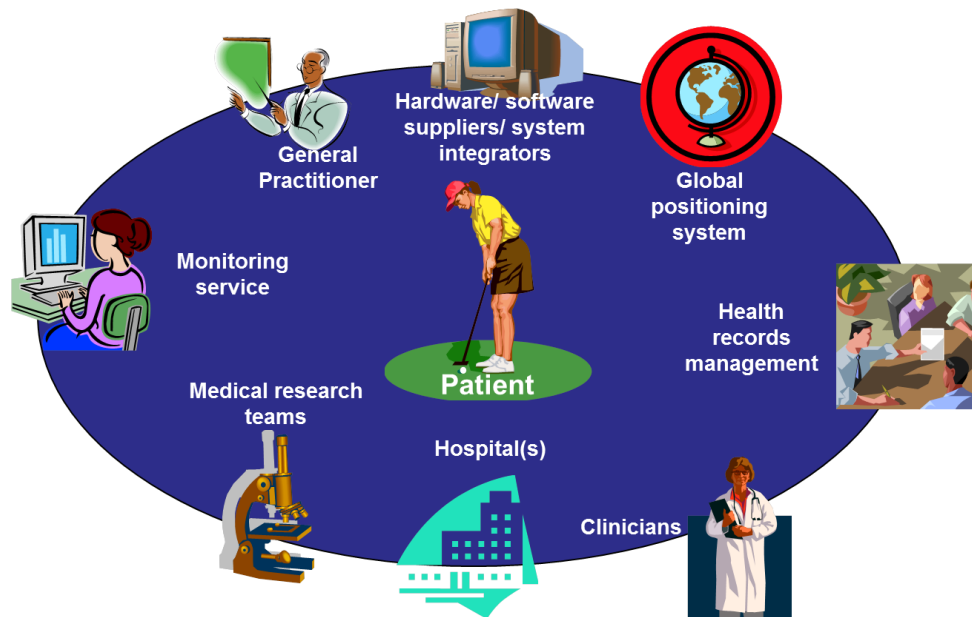


Figure 3: RAMPARTS

The *basic* requirements from RAMPARTS are:

- Collect real-time data about a patient's health from one or more medical devices carried by the patient.
- Transmit that data to healthcare professionals who may:
 - Administer medication or other treatment through one or more devices carried by the patient.
 - Contact the patient with instructions, for example, to take medicine or attend a clinic.
- Create Electronic Health Records (an electronic version of the medical record of the care and treatment the patient receives; it's kept up to date and looked after by the health care provider).
- Update Personal Health Records (information about the patient's health that the patient – or nominee - keeps up to date).
- Aggregate data and make it available for medical research.

Technologies available include:

- Mobile medical devices
- Global positioning systems
- Applications
- Short Message Service (SMS), e-Mail, Instant messaging (IM), etc.
- Smartphones
- The mobile data network
- The Internet

Draw a well-labelled and annotated diagram of an architecture that will support the secure delivery of RAMPARTS objectives through its expected function.

(14 marks)

3. **PERFORMANCE**

a) Explain the difference – with relevant examples – between leading and lagging metrics.
(4 marks)

b) Consider your RAMPARTS architecture from Question 2. Explain which metrics can be collected to show the state of the system's security to:

- A non-technical, board-level audience of stakeholders.
- A team on shift in a security operations centre.

Show how the measurements recorded may be represented on scorecards and dashboards, with a level of detail which is appropriate for the respective audiences.

(16 marks)

END OF EXAMINATION