

MDDS PART 4

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A BRIEF GUIDE TO MDDS

MDDS can assist in assessing whether a person can benefit from an AT/technology installation. It is a way of highlighting some of the key issues that might be forgotten in an AT/technology installation. Most importantly it is a way of producing a better, more dependable system for the user that meets their explicit and implicit needs.

We have divided the questionnaire into three main parts: the '**LOCATION-SPACE FORM**'; '**MAIN TECHNOLOGY ASSESSMENT**' and the '**ASSESSING THE SYSTEMS**'. The first two parts are specifically designed as quick reference questionnaires. They are made up of questions that should be addressed before considering a new system, an upgrade or modification. Essentially the first two questionnaires should enable decisions on whether a system is actually required or whether alternatives are more sensible. The intention of this first two questionnaire is to stop people being supplied with technology they do not need, will not use, cannot use or do not want. The responses to the questions in this questionnaire can also be of use in determining which parts of the third questionnaire to use.

The third questionnaire consists of eighteen sections that follow the dependability diagram and take the questionnaire user through a range of different issues that the technology and the system user should be answerable to. These questionnaires are divided into three areas namely the:

- 1) "**Key Question**" which is a simple question to frame what the section of questions relates to.
- 2) "**System Related Questions**" which are related directly to the devices and the technology systems. These tend to be somewhat technical but are the type of questions that need to be asked to potential providers of the decided system as they will all effect how the system operates with the user.
- 3) "**User Related Questions**" which are the questions that are required to be asked about how the system will interact with the user as well as the use of the system by the user. These might range from simple observational instructions (that anyone can do) through to more complex professional assessment based questions that might require professional opinions (this is also a good way of opening dialogues with professionals that might not have been consulted at this early stage).

Work through the first questionnaires and note down the important questions that will be required to be addressed in the design. Sometimes some of the

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questions might not be able to be answered immediately but will become evident as the design becomes more robust.

The '**LOCATION-SPACE FORM**'; '**MAIN TECHNOLOGY ASSESSMENT**' together should indicate whether the person should receive a system and provide a basic overview of some of the more essential dependability issues you might need to overcome.

'**ASSESSING THE SYSTEMS**' follows the domestic model of dependable systems (diagram figure 1) and outlines a series of questions relating to the systems and the person that might be useful in designing a dependable system. In essence, we see the questions associated with each attribute to be prompts for the system specifier to help reduce the chances of them neglecting important dependability issues. We expect the specifier to answer each with a yes/no answer and, where appropriate, extend the 'yes' answers with reminders of essential issues that have to be taken into account in the system design such that it meets the true needs of the user.

Throughout the design and build of the specified design the questionnaires can be used as a reference point to alert the designer to possible dependability issues that might need to be avoided.

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PART 1: THE LOCATION-SPACE FORM

Section	Element	Location / Room / Space	Proposed Device / System	Main Activities within location	Secondary Activities within location	Issues concerning potential devices
Fitness for Purpose	Transparency					
	Requirements					
Trustworthiness	Availability and Reliability					
	Safety					
	Confidentiality and integrity					
	Maintainability					
	Survivability					
Acceptability	Usability					
	Learnability					
	Cost					
	Compatibility					
	Efficiency					
	Responsiveness					
	Aesthetics					
Adaptability	Configurability					
	Openness					
	Visibility					
	User Repairability					

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Other Issues

**PART 2:
MAIN TECHNOLOGY ASSESSMENT**

	Yes	No
1. Why is a new system being considered?		
• Need	<input type="checkbox"/>	<input type="checkbox"/>
• Cost	<input type="checkbox"/>	<input type="checkbox"/>
• Lack of service availability	<input type="checkbox"/>	<input type="checkbox"/>
• Decrease in ability (cognitive, physical, mobility, emotional)	<input type="checkbox"/>	<input type="checkbox"/>
• Newer or better technology available	<input type="checkbox"/>	<input type="checkbox"/>
• Financial Pressures	<input type="checkbox"/>	<input type="checkbox"/>
2. Will the system do what is expected of it?		
• Will the system do what is required of it in the way the user expects it to?	<input type="checkbox"/>	<input type="checkbox"/>
• Will the system meet the users' specified needs?	<input type="checkbox"/>	<input type="checkbox"/>
3. Will the system make the user feel better, safer, or more in control of their environment?	<input type="checkbox"/>	<input type="checkbox"/>
• – How?	_____	
4. Will the system enable the user to undertake tasks previously too complex or difficult?	<input type="checkbox"/>	<input type="checkbox"/>
• In what ways?	_____	
5. Is it important that the system be non-confusing for the user and easy to operate?		
	<input type="checkbox"/>	<input type="checkbox"/>
6. Will the system constrain the user to act in certain ways or modify their behaviour in order for the system to work appropriately?		
	<input type="checkbox"/>	<input type="checkbox"/>
7. How will it be determined that the current or new system is best suited to the user?	<input type="checkbox"/>	<input type="checkbox"/>
8. Could the user benefit from further system enhancements?		
• Do these enhancements necessitate extending the system or are alternatives available?	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

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- | | Yes | No |
|---|--------------------------|--------------------------|
| • Have manual/non high-tech solutions been ruled out? | <input type="checkbox"/> | <input type="checkbox"/> |
| • Are these compatible with the current system? | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Will the system meet budgetary constraints? | <input type="checkbox"/> | <input type="checkbox"/> |

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PART 3: ASSESSING A SYSTEM: WHAT TO LOOK FOR AND WHAT TO AVOID

This main questionnaire is made up of four sections containing a range of questions relating to the four main themes namely:

Fitness for purpose

All systems should be 'fit for purpose', and do what they are intended to do, but how this actually manifests itself is the crucial point of the design. The system must meet the expectations, desires and requirements of the user and work as expected in a transparent fashion.

Trustworthiness

Questions ascertain what level of trust the user will place on the system and what elements of the system are required to be reviewed in order to make the system more trustworthy

Acceptability

These questions allow the determination of what constitutes an acceptable system for the user. These question the notions of how the system will operate and appear to the user.

Adaptability

Systems require change, upgrading, modifications of various degrees. The ideal system should be future-proofed and able to be upgraded with no loss of functionality (although perhaps enhanced functionality) whilst still using the same methods of operation. A system that requires the user to learn a whole new pattern of operations could be considered unsatisfactory.

Note: The full explanation of the origin of these dependability criteria is available to be read at

<http://www.smarthinking.ukideas.com/Dewsbury%20Sommerville%20Safecomp%20final%202003.pdf>

Fitness for purpose: 01 – Transparency

Key Question

TR01. How does the system meet the user's wishes, needs and desires?

TR02. How understandable are the operations of the system?

System Related Questions

TR03. What is the intention for the system: to support the person to lead an independent life or monitor all activities just in case of an adverse eventuality? **Support or Prevention**

TR04. Could the system disempower or disable the person in any way?

TR05. Does the system require duplicate devices to provide a level of redundancy?

TR06. Is it required that the system be clearly understood by the user?

TR07. Is the system needed or are alternative devices possible?

TR08. Have all alternatives been exhausted?

User Related Questions

TR09. In what ways might the user have to adapt their lifestyle to suit the system?

TR10. In what ways might the system interfere with current and future activity patterns?

TR11. How could the system fail to meet the true needs of the user?

TR12. What could the user really want from supportive systems?

TR13. In what ways might the system make the user more isolated?

TR14. In what ways might the system make the user feel alienated in their home?

TR15. What steps are required to avoid the system being perceived as intrusive?

TR16. Is the system envisaged to replace human contact?

TR17. Who determines the appropriate devices for a person?

Fitness for purpose: 02 - Requirements

Key Question

- RQ01. What are the requirements for the system and user?
RQ02. What is the real purpose of the system?

System Related Questions

- RQ03. Should the system be hard or soft wired, Radio Frequency (RF), Bluetooth, Infra-Red or a combination system?
RQ04. Is the system a retrofit or new build?
RQ05. What subsystems are required?
RQ06. What activities and instances should the system respond to?
In what way should this response be framed?
RQ07. What is not required?
RQ08. What systems are uncertain at this stage?
RQ09. Who is going to use the system?

User Related Questions

- RQ11. How is the person expected to use the system?
RQ12. What user activities and processes should the sensors be set to respond to?
RQ13. Is the timing of events and user related activities important to consider?
RQ14. What constraints on the system will be required to meet the needs and aspirations of the user?

Trustworthiness: 01 - Availability and Reliability

Key Question

ARO1. What level of service is required?

System Related Questions

- AR02. When is the system required to work?
- AR03. What effect would there be if the system fails to work when required?
- AR04. Is the system expected to work in a certain manner all the time?
- AR05. What would happen if the system responded unexpectedly?
- AR06. Are components of the system and subsystems always required to record the correct sensor derived inputs?
- AR07. Is it crucial for the sensors to accurately measure what they are supposed to measure?
- AR08. Is it critical that the system produce no false positives or false negatives?
- AR09. What user interactions might cause the system to become unavailable or unstable or produce false readings?
- AR10. How would the system respond in the event of an emergency such as a power cut or other critical instance?
- AR11. Will the system response meet the needs of the user in a predetermined time frame?
- AR12. At what level could the system become error prone or faulty, become unavailable or unstable?
- AR13. Does the system require redundant devices?

User Related Questions

- AR14. Is the user likely to break any components of the system?
- AR15. What personal data is stored by the system?
- AR16. Who needs to access personal data?
- AR17. Are all the devices/components within the system really required by the user?
- AR18. Is it important that the user be able to use the system when they want to in the way they want to?
- AR19. Is it important that the system distinguish between multiple occupancies?

Trustworthiness: 02 – Safety

Key Question

SF01. How can the safety of the user be ensured?

System Related Questions

SF02. What elements of the system are likely to be potentially endanger the user at any time?

SF03. Are fail-safe or fail-open protocols required?

SF04. If the system fails to operate in normal use what potential outcomes might arise?

SF05. How would the system handle potential critical instances?

SF06. In what ways might the user be affected by system failures?

SF07. If the system operates abnormally is the user likely to be in danger?

SF08. How is the system supposed to cope with emergency situations such as the user being attacked, falling, becoming ill, dying etc.?

User Related Questions

SF09. Has a technology risk assessment been undertaken?

SF10. How does it affect the system design?

SF11. Does the system prevent the user experiencing acceptable risk situations?

SF12. Has the system been honestly represented to the user or are there potential misinterpretations of the systems abilities?

Trustworthiness: 03 - Confidentiality and Integrity

Key Question

CI01. Does data need to be stored by the system either locally or remotely?

System Related Questions

CI02. What alerts or conditions are required to be captured and reported by the system?

CI03. What types of information collected by the system can be considered confidential?

CI04. Where should the data be stored?

CI05. What information is required to leave the home?

CI06. Why does the information need to leave the home?

CI07. Who is to receive the information?

CI08. Which people need access to system data?

CI09. What expected actions are they likely to take as a result of receiving the information from the home?

CI10. How can the appropriate external response actions be guaranteed?

User Related Questions

CI11. How can the user's privacy and confidentiality be ensured?

CI12. Does the user understand that personal data could be transmitted out of the home?

CI13. How would the user feel if information from the system was accessed by unauthorised people?

CI14. What user information should the system automatically delete?

Trustworthiness: 04 - Maintainability

Key Question

MN01. Can the system be easily modified if there is a problem with its working or for upgrading?

System Related Questions

MN02. How often does the system require servicing?

MN03. Does the service contract with the installer provide for emergency responses?

MN04. Who is responsible for contacting the repairers?

MN05. How long will it take to get the system reset or restored in the event of a failure?

MN06. How is the system configured to respond in the event of an emergency?

MN07. Are critical devices installed in easily located and accessible positions for quick servicing?

MN07. Does the system have the availability of remote maintenance?

MN08. If so does this impact on security and confidentiality?

MN09. When will remote maintenance not be an option?

User Related Questions

MN10. How can the user assist in the maintenance and restoration of the system?

MN11. Who is responsible for servicing and maintaining the equipment?

MN12. Are only professionals allowed to reset the system?

Trustworthiness: 05 - Survivability

Key Question

SU01. Does the system need to survive power cuts/ power failures?

System Related Questions

SU02. Does the system require protection against power cuts?

SU03. If so what level of back up is required?

SU04. What components of the system are considered to be critical?

SU05. What would happen if these components failed?

SU06. What provision is made for various emergency situations (Such as system crash; viruses; hackers; etc)?

SU07. Can the user assist the system to survive external attacks?

User Related Questions

SU08. How easy it is to reset the system after the power is restored?

Acceptability: 01 - Usability

Key Question

US01. How easy is it for the user to use the system appropriately?

System Related Questions

US02. Are all the devices positioned correctly?

US03. Are the devices installed discretely and securely?

US04. Is text of the correct size, font, colour and contrast?

US05. Are audible alerts audible and clearly understandable by the user?

US06. Can visual alerts exacerbate other conditions?

US07. Does the user understand what the system is supposed to do?

US08. How does the user interact with the system?

US09. Is it necessary for the user to understand the system architecture?

User Related Questions

US10. Could the user cause a critical incident from “misusing” the system?

US11. How can this be avoided?

US12. What specific needs of the user were translated into devices that were added to the system?

US13. Can the user operate the system in the way they would want to?

US14. Does the system provide visual/audible/textural cues to assist the user in operating the system?

US15. How does the system alert the user to faults, errors and failures?

US16. Are these alerts potentially confusing?

Acceptability: 02 - Learnability

Key Question

LN01. Can the user easily learn how to use the system without excessive training?

System Related Questions

LN02. In what ways is the system required to be easy to learn to use?

LN03. What parts of the system does the user not require information on?

LN04. Does the system require a long manual to understand it?

LN05. Is there a quick start guide to assist the user?

LN06. Is the user fully aware of the system's limitations?

User Related Questions

LN07. Does the user understand what to do in any common event?

Acceptability: 03 - Cost

Key Question

CS01. Is the system affordable even when running costs are taken into account?

System Related Questions

CS02. What budget is available for the system?

CS03. Does this budget include installation, maintenance and repair bills, plus unforeseen extras?

CS04. What additional costs are there likely to be in the future?

CS05. Does the user benefit enough to warrant the expenditure of the system or are other options to be considered?

User Related Questions

CS06. Is the user liable for expenses relating to the system?

CS07. What maintenance costs will there be associated with the system?

CS08. Who will pay when a new device is required?

CS09. Will the system incur substantial running costs that will affect the users' personal budget?

Acceptability: 04 - Compatibility

Key Question

CP01. Will the system work with the other equipment the user might have in the house or might there be conflicts?

System Related Questions

CP02. Are all the system components compatible with each other?

CP03. What hardware is likely to cause conflicts or be difficult to configure with the system?

CP04. In what ways might the system become less stable if further components are added to it at a later stage?

CP05. Does the system use non-proprietary components that can be easily sourced to speed up repairs?

CP06. Are alternative components available to be used should original components fail?

CP07. Is the system future-proofed as far as possible?

CP08. Will any common electrical items interfere with the system?

User Related Questions

CP09. Is the system compatible with the user or will conflicts arise from its installation?

Acceptability: 05 - Efficiency

Key Question

EF01. Is the system efficient in terms of use and cost?

System Related Questions

EF02. Are the devices efficient in terms of power consumption?

EF03. Is the system the most efficient way of obtaining the required data from the user?

User Related Questions

EF04. Is the system an efficient use of resources?

EF05. Is the system ergonomic to use?

Acceptability: 06 - Responsiveness

Key Question

RP01. Does the effort and time saved by using the system significantly exceed the effort involved in making use of it?

System Related Questions

RP02. How likely is the system to be unresponsive and likely to need reconfiguring?

RP03. How long are the response times for a user generated alert?

RP04. Can the system be easily reconfigured by the support workers or the user for more responsiveness?

RP05. In what ways does the user have to go out of their way to use the system?

RP06. What aspects of the system are required to respond in a timely and appropriate manner?

RP07. What special characteristics such as timing are required in the system?

RP08. Is Lifestyle monitoring (the ability to let the system detect activity pattern changes) an important component of the system

User Related Questions

RP09. In what ways does the user benefit significantly from the system?

RP10. In what ways does the system support and assist the activity patterns of the user?

Acceptability: 07 - Aesthetics

Key Question

AE01. Does the system fit acceptably with the decoration of the user's home?

System Related Questions

AE02. Does the system alter the activity patterns of the person due to its appearance?

AE03. Is the system likely to create behaviours as a result of its appearance?

AE04. Can devices be resituated to make them more discreet?

User Related Questions

AE05. How does the user feel about the appearance of the system?

AE06. Does the system blend in and co-ordinate with existing colour schemes in the home?

Adaptability: 01 - Configurability

Key Question

CF01. Can the equipment be reconfigured *in situ* to cope with particular capabilities?

System Related Questions

CF02. Can the system be easily upgraded or self-upgraded?

CF03. Can the system be easily reconfigured?

CF04. What limitations to reconfiguration are there?

User Related Questions

CF05. Can the user or support worker fine-tune the system?

CF06. Is there limited user interaction with the system?

CF07. Can the user control information leaving the home?

Adaptability: 02 - Openness

Key Question

OP01. Can the system be extended using other people's equipment?

System Related Questions

OP02. Can the system be extended easily using other manufacturer's devices?

OP03. What potential conflicts could arise through using other devices with the system?

OP04. What devices cannot be fitted to the system retrospectively?

OP05. Are any conflicts likely due to devices already being operated by the user?

OP06. Is it intended that the system have no serviceable/user interactive parts?

User Related Questions

OP07. Will the user want to extend the system themselves?

Adaptability: 03 - Visibility

Key Question

VS01. Is it clear to the user what the system is or supposed to be doing?

System Related Questions

VS02. Are system plans available for service engineers?

VS03. Are system processes explicit?

VS04. Does the system have a help facility?

User Related Questions

VS05. Is the system too complex to be visible and understandable by the user?

Adaptability: 04 - User Repairability

Key Question

UR01. Can the user fix the system if it goes wrong or needs resetting?

System Related Questions

UR02. Will the system support user repairability?

UR03. Is there a help menu built into the system or a systems diagnostics feature?

UR04. Can the system be easily restored to system defaults?

User Related Questions

UR05. Does the user require special access codes, or specialised knowledge to assist in the diagnosis of the system problem?

UR06. Can devices from the system be repaired by the user or obtained locally, or is a special order required?

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Attribute Number	Comment
Transparency	
TR01	
TR02	
TR03	
TR04	
TR05	
TR06	
TR07	
TR08	
TR09	
TR10	
TR11	
TR12	
TR13	
TR14	
TR15	
TR16	
TR17	
Requirements	
RQ01	
RQ02	
RQ03	
RQ04	
RQ05	
RQ05	
RQ06	
RQ07	
RQ08	
RQ09	
RQ10	
RQ11	
RQ12	
RQ13	
RQ14	

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Availability and Reliability	
AR01	
AR02	
AR03	
AR04	
AR05	
AR06	
AR07	
AR08	
AR09	
AR10	
AR11	
AR12	
AR13	
AR14	
AR15	
AR16	
AR17	
AR18	
AR19	
Safety	
SF01	
SF02	
SF03	
SF04	
SF05	
SF06	
SF07	
SF08	
SF09	
SF10	
SF11	
SF12	

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Confidentiality and Integrity	
CI01	
CI02	
CI03	
CI04	
CI05	
CI06	
CI07	
CI08	
CI09	
CI10	
CI11	
CI12	
CI13	
CI14	
Maintainability	
MN01	
MN02	
MN03	
MN04	
MN05	
MN06	
MN07	
MN08	
MN09	
MN10	
MN11	
MN12	
Survivability	
SU01	
SU02	
SU03	
SU04	
SU05	
SU06	
SU07	
SU08	

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Usability	
US01	
US02	
US03	
US04	
US05	
US06	
US07	
US08	
US09	
US10	
US11	
US12	
US13	
US14	
US15	
US16	
Learnability	
LN01	
LN02	
LN03	
LN04	
LN05	
LN06	
LN06	
LN07	
Costs	
CS01	
CS02	
CS03	
CS04	
CS05	
CS06	
CS07	
CS08	
CS09	

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Compatibility	
CP01	
CP02	
CP03	
CP04	
CP05	
CP06	
CP06	
CP07	
CP08	
CP09	
Efficiency	
EF01	
EF02	
EF03	
EF04	
EF05	
Responsiveness	
RP01	
RP02	
RP03	
RP04	
RP05	
RP06	
RP07	
RP08	
RP09	
RP10	
Aesthetics	
AE01	
AE02	
AE03	
AE04	
AE05	
AE06	

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Configurability	
CF01	
CF02	
CF03	
CF04	
CF04	
CF05	
CF06	
CF07	
Openness	
OP01	
OP02	
OP03	
OP04	
OP05	
OP06	
OP07	
Visibility	
VS01	
VS02	
VS03	
VS04	
VS05	
User Repairability	
UR01	
UR02	
UR03	
UR04	
UR05	
UR06	

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Additional Comments

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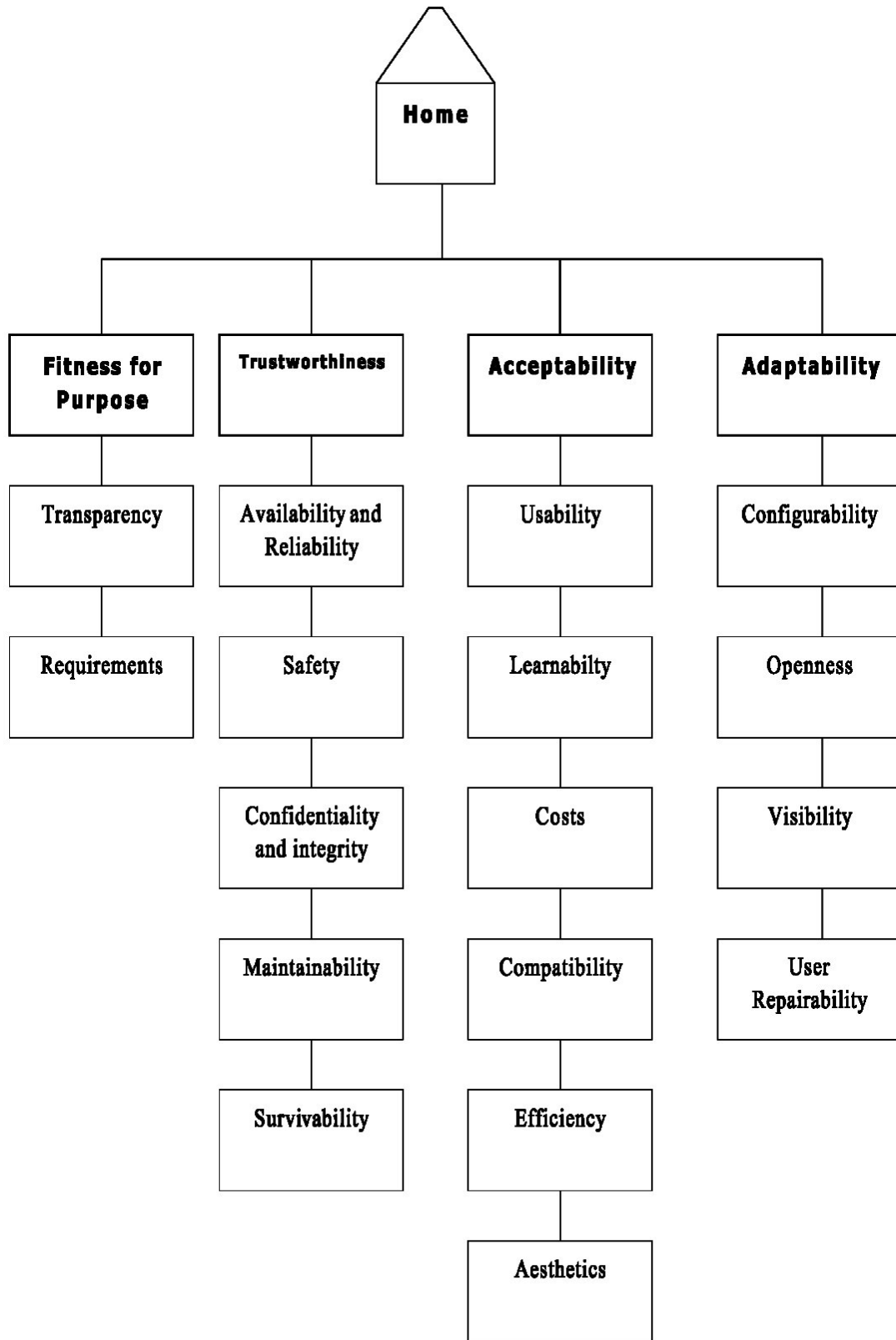


Figure 1: The Domestic Model of Dependable Systems