Project Assignment 2

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The following table summarizes the analysis of maintainability and availability of the ACIDS system. See the accompanying spreadsheet for details of the calculations.

A_o	0.176295589
MTBM	2.837684449
MDT	13.25848941
$\overline{M}$	0.239193152
M_{ct}	1.25
M_{pt}	0.177083333
LDT_c	33.88235294
LDT_s	7.0
LDT	8.556186152
ADT_c	12.0
ADT_s	4.0
ADT	4.463110102
$MTBM_u$	49.01960784
$MTBM_s$	3.012048193
λ	0.0204
fpt	0.332

A_o is well below the threshold of 0.8 and the goal of 0.9 however a quick calculation for the probability of mission completion reveals that, given the mission parameters on Slide #6, one (1) spare is sufficient to raise the probability of mission completion to over 0.99.

$$\begin{aligned} \lambda &= 0.0204 \\ t &= 2 \text{ hours} \\ n &= 1 \text{ system} \\ n\lambda t &= 0.0408 \end{aligned}$$

Using *Figure 15.7* on page 517 of *B&F* we find that with zero (0) spares there is a slightly better than 90% probability of mission completion. With one spare the percentage climbs to over 99%. So while the system does not meet the criteria for A_o, one (1) spare is sufficient to exceed the METAL-V required reliability of 0.96.