

FACULTY NOTES

The LTAs and Spinoffs are designed so that each professor can implement them in a way that is consistent with his/her teaching style and course objectives. This may range from using the materials as out-of-class projects with minimal in-class guidance to doing most of the work in class. The LTAs and Spinoffs are amenable to small group cooperative work and typically benefit from the use of some learning technology. Since the objective of the LTAs and Spinoffs is to support the specific academic goals you have set for your students, the Faculty Notes are not intended to be prescriptive. The purpose of the Faculty Notes is to provide information that assists you to take full advantage of the LTAs and Spinoffs. This includes suggestions for instruction as well as answers for the exercises.



FACULTY NOTES

Spinoff 10B

Analyzing the Cost Effectiveness of NASA's Automated Window Inspection Device (AWID)

Comments

The exercises in Spinoff 10B require information from the first section (**Background**) of LTA 10. A copy of the **Background** should be handed out to students, or the information in it should be presented in class.

The costs given in this activity are very rough since labor costs change and the AWID is being constantly improved. Also, the AWID has other costs associated with it, such as development costs and the expense of constant improvements and innovations, which are not considered here. Since the AWID is simply so much better at finding and categorizing defects, it can lead to far better models of the Orbiter windows and further cost savings. Most importantly, the AWID has great value in improving the safety of the Shuttle crew.

Solutions

Assume a technician cleaning or inspecting an Orbiter window works 8 hours each day and, with benefits, makes approximately \$23.35 per hour.

- 1) 6 windows
- 2) $5 \text{ days} * 2 \text{ techs} * 8 \text{ hrs/day} = 80 \text{ technician-hours}$
- 3) $6 \text{ windows} * 2 \text{ techs} * 1 \text{ day/window} * 8 \text{ hrs/day} = 96 \text{ technician-hours}$
- 4) $(80 + 96) \text{ hrs} * \$23.35/\text{hr} = \$4,109.60$
- 5) $(80 \text{ hrs} + 96 \text{ hrs})/2 = 88 \text{ hrs} = 11 \text{ days}$ (Assume an 8-hour day.)
- 6) $6 \text{ windows} * 2 \text{ technicians} * 2 \text{ hrs/window} = 24 \text{ technician-hours}$
- 7) $24 \text{ hrs} * \$23.35/\text{hr} = \560.40
- 8) AWID takes $8 \text{ hrs} * 4 \text{ large windows} + 5 \text{ hrs} * 2 \text{ smaller windows} = 42 \text{ hrs}$. The technicians take a further 12 hours to install and remove the windows ($24 \text{ technician-hours} / 2 \text{ technicians}$) for a total of 54 hours = 6.75 days.
- 9) There are 7 Shuttle missions a year. Manual time and costs are 77 days and \$28767.20. AWID time and costs are 47.25 days and \$3922.80. The savings are 29.75 days and \$24844.40