CHANDRA
X-ray Center

MEMORANDUM

October 24, 2001

To: ACIS Operations Team
From: Joseph DePasquale
Subject: Overview of the ACIS Limit Pager Script

1 Introduction

After reaching a conclusive set of ACIS telemetry limits, these limits were incorporated into a script called *limitpager.pl* that runs during periods of real-time communication with Chandra. The script evaluates the telemetered ACIS diagnostic data against the new limits and sends emails for yellow violations and pages for red violations. The purpose of this memorandum is to review the philosophy behind this script's operation, including how this script tests the limits against the data, and the criteria for paging and emailing. Also included is a review of the design of the real-time web page and the reasoning behind maintaining two sets of web pages: the primary and backup pages.

2 Paging Script Overview

2.1 Basic Operation

The script is actually run as a part of a *cron job* that runs every 5 minutes. It contains logic that determines when COMM has been established and a conditional that allows it to continue running if COMM is established. While in COMM, telemetered data is piped to a computer and sorted into *trace log* files that are updated every major or minor frame. These data are then averaged over 10 frames and the ouput is in the form of *log* files. The *limitpager* script uses these logfiles to compare data against limits; this is a more robust method given that spurious readings will be averaged out over 10 frames. The script determines the current OBSID as well as the current Altitude and Direction, for use in the case of a limit trip. The script then evaluates the *status bits* to ensure that they are in their expected states. It also keeps track of whether science is idle or active. Having done this, the script then evaluates the data against all mnemonics for which there are defined limits. This includes logic that will not trip the caution hi (yellow) limit for *1CR[AB]T* if science is idle, essentially during perigee passage. The Cold Radiator tends to warm up past the caution hi limit at this point in orbit.

2.2 Email/Paging Criteria

While the script is running it writes to an *alert file* that keeps track of any violations that occured in the previous run. This way, if one violation has occured of any limit, it will have been recorded and the next violation will set off the email/page portion of the script. The script will send an email if two successive evaluations reveal either yellow violations or a combination of yellow and red violations. The script will only send a page when two successive red violations have occured. In either case, the script only sends a message when two violations have occured so as to avoid multiple messages over a short period of time. It seems that the two successive violation criteria works well as this will occur around 10 minutes into any given COMM. This alerts people to potential problems generally *1/6* of the way into COMM, allowing more time to react. In addition to the violation messages, the back-up version of *limitpager* sends a page when COMM has been established if it occurs between the hours of 8am and 12am. The message simply states in the subject line "We are currently AOS." Anyone wishing to be added to the list of those to be paged for COMM, please let me know.

2.3 Sample Violation Message

The following is an example of a message that was generated as a test during a recent perigee passage:

```
ACIS ALERT During Current COMM Pass!
YELLOW_HI limit tripped 2 times!
MSID: 1CRAT
Last Violation Value:  -123.15
******************************
Current OBSID: 2365
Current Altitude / Direction:  50219 / A
Date and Time:  Tue Oct 23 07:00:04 GMT 2001
Check http://asc.harvard.edu/mta/RT/acis/www/acis-mean.html for latest info.
```

This type of limit violation would be sent via email. However, in this case the logic has now been implemented that would disregard this particular violation because we know why it is caused and it will happen at every perigee passage.

3 Real-Time Web Page

The design of the real-time web page in conjunction with the *limitpager* allows for a comprehensive and relatively quick overview of diagnostic data during a given COMM pass. The web page employs the same limit set as well, changing font colors to red and yellow accordingly when violations occur. There are at all times two completely independent versions of the web page and *limitpager* scripts running every five minutes - a back-up and a primary version. The primary version runs on *xcanuck* and the back-up runs on *psicorp*; this ensures that in the even that either of these machines crashes, there will still be a web page and limit evaluations will continue. The back-up version of the *limitpager* script will only send messages to Shanil and myself. The primary version will contain all addresses of people wishing to be emailed/paged in the event of a violation.

4 Remarks

As always, I invite any comments and suggestions regarding the script; if anyone would like to see changes to the violation message please let me know. Anyone wishing to be added to the script to be emailed/paged please send me an email with the appropriate information.
jdepasquale@head-cfa.harvard.edu