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Sextant Test software post-mortem

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Contents

1 Introduction

The "Sextant Test software post mortem committee" met in March and April 1997, to evaluate the Sextant Test experience. Table 1 outlines the discussions that took place. A slightly more detailed description of the topics under discussion is included in Appendix A. Meeting minutes are included in Appendix B. The names attached to the topics are the discussion facilitators.

Topic	Facilitator(s)	Date
FEC performance & resources	Hoff	March 14
ADOs/managers	Satogata	March 19
PET	Clifford, d'Ottavio	March 19
Development environment	Satogata	March 21
Throughput - network and otherwise	Clifford	March 26
Power supplies, Ramping, Sequencing	Kewisch	March 26
Cryo & Vacuum	Ganetis	March 28
Database usage	Trahern	March 28
Data logging	Laster, Trahern	April 2
Plotting measured values	Peggs	April 2
Error/Fault handling	Hoff	April 4

Table 1: Schedule and topics of the Sextant Test post mortem meetings.

The main purpose of these discussions was to generate the Action Items that are listed in the next section. These action items are not prioritized. They do not address issues of resource allocation - it may not be possible to perform all the actions before RHIC is commissioned. Little or no attempt is made to address the difficult issue of the integration, or tying together, of RHIC and AGS control systems.

Prioritization, implementation, and resource allocation issues arising from the Action Items will be addressed, in part, by a steering committee consisting of Barton, Clifford, Ganetis, and Peggs.

2 Action items

2.1 FEC performance & resources

1. FEC installation and checkout process needs simplification.
2. System parameters, such as memory usage, should be routinely logged to provide better FEC failure statistics.
3. Incomplete FEC features, such as grouped async requests should be addressed.
4. Missing FEC features, such as device reservation and universal timestamp should be addressed.
5. SYBASE should play a larger role in ADO configuration, including other non-Physics related FEC configuration.

2.2 ADOs/managers

1. Resolve mechanism for one manager handling requests in different contexts (lack of Get() with a context).
2. Write more specific manager design documents (c.f. ADO design FAQ on WWW).
3. Write more detailed manager interface and usage documentation.

2.3 PET

1. Controls should continue to develop PET with an eye to integration with the AGS Spreadsheet. Requested features should be added (as resources allow).

2.4 Development environment

1. Write/maintain FAQ for developer environment, releases, libraries.
2. Design and implement higher level UI Widget libraries (c.f. UIBeamline).
3. Improve the ability to rapidly create GUIs for applications.
4. Produce a library functionality and dependency index for developers.
5. Maintain compile/link cycle at 5 minutes or shorter.
6. Ensure that debuggers and other development tools (eg PURIFY) work properly.
7. Revisit, streamline, and document release and replication strategy.

2.5 Throughput - network and otherwise

1. Define and measure ADO and manager scaling and performance requirements for RHIC using prototype applications. Simulate FEC data sources where equipment is not available.
2. RAP should provide realistic scenarios for data transactions and flow for major applications. Controls shall identify and make measurements on important throughput parameters. These measurements shall be repeated on system updates.
3. The performance envelope parameters for data transfers listed in the Design Manual should be revised as necessary to reflect these new criteria.
4. Review requirements of the operations servers. Make sure no server is so heavily loaded with tasks that the system bogs down. Limit the number of tasks per server.

2.6 Power supplies, Ramping, Sequencing

1. Implement improved arithmetic precision in the WFG.
2. Resolve the issue of potential revision of WFG formulas.
3. Save/Restore: Define which parameter settings will be saved (global). Specify restore user interface, and scope of machine restore, assuring integration with AGS practice.

4. Complete the integration of RHIC alarms with the AGS system, to deal with hardware, software (dead processes), unreasonable requests, general alarm display, and applications.

2.7 Cryo, Vacuum, and Quench Protection

1. Implement error handling and recovery methods to improve the reliability and throughput of cryo data transfers. Look into block transfers of data sets, and error trapping and recovery schemes.
2. Look into a formal configuration control method for warning and informing all developers of software upgrades.

2.8 Databases

1. Move operational databases to operational db server.
2. Develop a more disciplined configuration system for ADOs.
3. More sophisticated web and db connectivity needed.
4. Develop a better way to manage ADO aliases.

2.9 Data logging

1. Identify the data logging users (eg quench protection), their measurements, and requirements.
2. Logging Management & Administration
   (a) How to select (by non-Controls personnel) signals to log? How to specify the length and periodicity for the data to be logged? Build operations interface.
   (b) Specifiy location & format of logged data: database, SDDS files, other files, elsewhere? Concatenate multiple files before plotting, or is there a generic mechanism to 'find' the data and put it together?
   (c) How does logged data get backed up, archived, and managed? How much is it necessary to keep, and over what time period can it be condensed?
3. Logging Acquisition

(a) Decide whether to cache high-bandwidth logging on FECs and improve transfer efficiency.

(b) Implement a logging watchdog to ensure that logs are updating properly.

4. Logging retrieval & display

   (a) Decide whether current tools (sdds, graphics) are sufficient for RHIC development and implementation.

   (b) Specify data correlation, rate, and plotting requirements. Eg, need to view data (losses, vacuum pressures, ...) vs. beam line position.

2.10 Plotting measured values (ADO parameters)

1. Develop a general purpose utility for "pseudo-realtime" PLOTTING of *any* measurable quantity (ADO parameter), with performance similar to the Fermilab package.

   (a) typical: plot a few channels (4) versus time at $\geq$ 15 Hz.

   (b) extreme: plot one channel at speeds up to WFG max (720 Hz)

   (c) parameter versus parameter plotting possible

   (d) plot parameters across multiple FECs

   (e) data always viewed on a console

   (f) start/stop on event

   (g) free run or single shot

2.11 Error/Fault handling

1. Existing MCR reporting mechanisms, such as the Operations Support Group, and "action please" need to be more fully used.

2. Mechanisms for problem reporting should accommodate the lengthy startup or shutdown periods before and after running RHIC.

3. The System Monitor application should be used to ensure that FECs are running.

4. Consoles should be tested to ensure no dependencies on development file servers.

A List of Topics Considered

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-------------------------------------------------------------------------
1) FEC performance & resources                          HOFF
    - memory usage, incl cache, w/ full functionality [crucial to
      #s of FECs]
    - Transactions: speed, volume, fit (cf ADOs), optimize app content BW
    - (prompt review of remaining instr. specs. & conceptual designs)
    - (processor platform/network upgrade?)
    - Crate reliability
    - lacking FEC features
    - configuration data & organization
    - SexTest statistics
    - FEC process interactions
-------------------------------------------------------------------------
2) ADOs/managers                                        SATOGATA
    - architecture: reusability & scaling
    - standards
    - device-specific form, fit & function review
    - (relationship to AGS devices?)
    - Manager concept is sound?
-------------------------------------------------------------------------
3) PET                                                  CLIFFORD (+ D'OTTAVIO)
    - flexibility in displays vs inconsistent interface
    - cf Gpm, spreadsheet
    - (mathematical & logical connections between cells)
-------------------------------------------------------------------------
4) Development environment                              SATOGATA
    - "get" & "getasync"
    - compile & link cycle, debugging
    - glish, sds
    ? meta-tools
    - standard GUI
    - administration: system, network, apps, ..
    - Xterminals
-------------------------------------------------------------------------
5) Throughput - network and otherwise                   CLIFFORD
    - what happened in SexTest (some mysteries remain)?
    - establish the relevant quantities, and predict their scaling
    - measure the relevant quantities in RHIC studies
    - (solutions like UDP?)
-------------------------------------------------------------------------
6) Power supplies & Ramping & Sequencing                KEWISCH
    - Global Save/Restore of WFG optics state of RHIC rings
    - PET application interface
    - Java?
-------------------------------------------------------------------------
7) Cryo & Vacuum                                        GANETIS
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- lead current helium flow
- user comments

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8) Database usage TRAHERN
- configuration data
- file or log organization (a la AGS)?
- storage requirements
- how many servers? operations, rap/survey/magnet, ...

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9) Data logging LASTER (+ TRAHERN)
- "how do I log some control data?"
- standard format: SDDS? xmgr? both?
- logging database evolution of ViewLog
- data correlation (cf AGS cycle number)

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10) Plotting measured values PEGGS
- "how do I generate a time plot?"
- (15 Hz generic ADO parameter plotter (cf Fermilab))
- correlation plots, ADOparameter vs ADOparameter
- (GPM?)
- (DigitalScope style MADC for any of the many (AGS) analog signals)
- Power Supply/Quench data plotted by off line PCs.

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11) Error/Fault handling HOFF
- Diagnosis: scope, reporting, logging, analysis
- Recovery: standards, device dependencies, sufficiency of methods
- Prevention
- what were the SexTest statistics?
- how to better track (RAPside) "trouble tickets"?
- (alarms)
- "action please" requests
- "discrepancy reports"

B Minutes

B.1 March 14 - 1) FECs

From hoff@acnindy02.rhic.bnl.gov Wed Mar 19 09:20 EST 1997
Date: Wed, 19 Mar 1997 09:18:47 -0500

A meeting was held on Friday, March 14 to discuss Sextant experience with FEC reliability and performance.

Jorg Kewisch, Todd Satogata, Don Barton, Steve Peggs, John Morris, Tom Clifford, and Larry Hoff were present.

Starting next week, this committee will begin meeting twice per week, on Wednesday and Friday at 9:30 in the 911-C conference room. At the next meeting, agenda topics "ADOs/managers" and "PET" will be discussed.

Steve Peggs presented slides from the recent MAC talk. Troublesome FEC areas included network throughput and reliability. However it was noted that FEC reliability has improved since last year.

One MAC slide also indicated that FEC installation and checkout process needs simplification, especially as the number of FECs grows.

Larry Hoff then acted as "facilitator" to guide discussion on Sextant experience with various aspects of FEC operation.

In general FEC resource usage was found to be adequate. However, there was a desire to distribute some of the magnet manager processing into the FECs, which could affect CPU usage. Don Barton cautioned against being too tempted to "tinker" in the FEC environment. Even so, the possibly of moving magnet manager processing (or any other processing) to the FEC was not ruled out.

Steve Peggs was concerned that the relevant communications performance parameters have not yet been identified, let alone measured or predicted.

Steve also noted the lack of "live" comfort displays during Sextant test.

Larry pointer out that a joint ACS/RAP communications working group has already been established, and therefore many throughput and applicability issues are already being addressed.

There was universal agreement that certain system parameters, such as

memory usage, should be routinely logged to provide better FEC failure statistics.

There was some discussion of missing FEC features, such as device reservation and universal timestamp. As yet, neither of these features have been designed.

There seemed to be universal agreement that the database should play a larger role in ADO configuration, but not necessarily in other non-Physics related FEC configuration.

B.2 March 19 - 2) ADOs/managers, 3) PET

From hoff@acn86s01.pbn.bnl.gov Thu Mar 20 09:52 EST 1997
Date: Thu, 20 Mar 1997 09:54:13 -0500

A meeting was held on Wednesday, March 19 to discuss Sextant experience with managers and the pet application

Jorg Kewisch, Todd Satogata, Don Barton, Steve Peggs, John Morris, Tom Clifford, Ted D'Ottavio, and Larry Hoff were present.

Todd acted as "facilitator" to guide discussion on Sextant experience with various aspects of manager design, implementation, and use.

Using the ADO interface, communication tools, and code generation tools were all thought of as great successes, with only minor limitations.

The lack of a "Get() with context" was brought up again.

The inability to run more than one manager on a host was brought up, although it was noted that work to solve this problem is ongoing.

Reliability did not seem to be an important issue. Certain known bugs are expected to be fixed, creating much more reliable managers. Typically managers did not need to 'cache' settings. Typically this was left to the FECs. Managers restored their state from FEC data.

Scaling and performance tuning were mentioned as important areas to investigate further.

The trouble of integrating shared memory ,managers (flag manager) with remote clients (sequencer, archiver) was noted.

Lack of "overview" documentation for managers was noted.

There was a lively discussion of manager philosophy. All Sextant managers added some value, and therefore were considered useful. Some managers added convenience, by grouping and correlating data. Other managers added physics content, translating magnet current into field strength, or deflection angle. Other managers added processing, such as fitting a Gaussian to a 2-d image. There was disagreement about whether this diversity of philosophy was a strength or a weakness.

Then Tom Clifford led a discussion of the Sextant experience with PET.

There seemed to be universal agreement that the user interface to switch PET pages could be vastly improved.

Everyone agreed that PET has proved to be an indispensable tool for engineering support, but there was some disagreement about how useful PET is (or should be) for operations. Steve Peggs referred to the Tevatron experience with a similar program to predict that PET would/should only be "somewhat" useful for operations (~ 15% usage). John Morris referred to the AGS experience with a similar program to predict that PET would/should be "very" useful for operations.

Jorg suggested that rather than making PET a "kitchen sink" in order to make it more useful for operations, another approach might be to provide other rapid protyping tools for applications, which might leverage existing PET algorithms. Ted pointed out that PET is available as a "popup" window, and that a combination of custom application with popup PET windows might be appropriate.

Finally Steve asked the question "How do we properly listen to operations?" to know what PET features should be added or improved.

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From clifford@bnl.gov Mon Mar 17 16:28 EST 1997
Date: Mon, 17 Mar 1997 16:28:57 -0500

The Parameter Edit Tool was written to be a data driven interface to ADO parameters. It was to provide easy access to ADO parameters and in turn to the underlying hardware. It was expected to be useful for commissioning of ADOs and the underlying hardware. PET is the first

line of Engineering Support Software.

PET was very useful in the sextant test being used by the tech staff in cfe install and check out. All the installed hardware and software (driver and ADO) are verified by some procedures that involve setting up and using PET pages.

Of course it was also used by the ADO developers in testing ADOs and drivers.

PET has become the primary interface to a number of systems used in the sextant test for which there is no application code. RTDL, the event generator, vacuum system, delay modules, permit (and quench) links, the quench system, rf systems, power supply digital control, and safety system come to mind. There is also the much used interface to the madc system. Well after the sextant test, 17 March, I see that there are 25 PET's on acnsun57.

The PET bug that I know about that was a factor in the sextant test causes aborts that occurred when changing pages. I understand that this was caused by aliases, which are much used. This bug has been fixed. But the result of the bug was that people lost confidence in switching pages in PET. This resulted in what I think is the wrong approach in StartUp with a StartUp entry for each page of PET. The file selection PET uses for pet pages is not very nice. There is a much better tree tool that is used by SpreasSheet and the LogRead program. Pet will use this tool in the future. The async reports to PET could be (can be) stopped by a fec that finds pet not responsive. There is no way to restart these reports without getting off the page. This is almost a bug.

In analyzing PET post sextant test a time wasting bug and a time wasting "feature" were found. The bug has been fixed. The time wasting "feature" was a formating of hundreds or thousands of array values even if only a few or even none were being displayed. This problem has not yet been fixed.

PET was also used at the interface for the magnet application. It was used in testing manager ADO's.

PET is to its potential as VisiCal is to Lotus123. Given ten years and an army of programmers PET could do the dishes. Well, almost.

PET has been used as an excuse not to do, at this time, some applications that most likely will be needed in the fullness of time. An MADC application is often mentioned (maybe AGS has done this!). The permit and quench links need an application.

Like Spreadsheet in the AGS, too often after an ADO works on PET it is declared working and finished without being stressed in ways that PET cannot stress a fec or ADO, like lots of commands.

There is a list of changes to make in PET. Some have already been done. There is also a large "wish" list for PET. Features like run a script from a cell, do calculations in a cell, changes the color of a cell depending on data and so on. Don't update cells not on the screen is a current popular request (and I think on an old list). How to manage these requests judging there importance, impact on the program and time to code and test is a problem.

There is a long-term, the plan is to integrate SpreadSheet and pet together. This means that SpreadSheet must run on the suns, which could/should happen by this summer. A first pass at this would be simply to create a RHIC leaf on the Machine Tree and have it bring up pet pages that are managed in the same way device pages are managed now.

Pet pages are viewed by Operations and others as harder to understand and use than SpreadSheet device lists. This is probably because of the greater variability in the page layout and look that we made available within pet. An madc page looks very little like a WFG page. We need to make these pages more consistent with each other and with SS device pages. Is this just a management problem? Operations should be able to design their own pages.

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B.3 March 21 - 4) Development environment

From hoff@acnindy02.rhic.bnl.gov Fri Mar 21 15:17 EST 1997
Date: Fri, 21 Mar 1997 15:18:25 -0500

A meeting was held on Friday, March 21 to discuss Sextant experience with the development environment.

Steve Peggs, Todd Satogata, Jorg Kewisch, Ted D'Ottavio, Don Barton, John Morris, Tom Clifford, and Larry Hoff were present.

This was a "good" meeting. A lot of very specific action items were raised, with very little disagreement.

FAQs were perceived as very useful, but not enough existed.

In general documentation was found to be very useful when it existed, but caused frustration when it was lacking.

Don Barton pointed out the need for making reasonable efforts at maintaining existing documentation and/or marking obsolete or incomplete documentation as being obsolete or incomplete. This might include assuring that there is a responsible person for each document, and perhaps a person responsible for missing documentation.

Included on the documentation "wish list" were :

* FAQ for development environment
* Examples for using AdoIf callback functions and Event Handlers
* Add ADO inheritance information to ADO design FAQ
* Document specific aspects of ADO environment, such as access protection for ADO methods and data
* Standard methods for "internal" (code) documentation.
* Standard methods for "overview" (application/manager/ADO documentation.
* Library functionality and dependency documentation.
* Easier methods for findings appropriate documentation if it exists.

The need for "higher level" graphical objects (widgets) was noted. Ted noted that such work was in early planning stages already.

Purify is considered an extremely useful tool because it works so well, and is so easy to use. Profilers are considered useful as well, but currently require detailed knowledge to operate.

The GNU debugger doesn't always work, which can be frustrating.

Jorg noted some restrictions of adogen which preclude ADOs from including each other's class definition files.

Compiling and linking can be time consuming.

SDS has bugs but no one assigned time to fix them.

GLISH functionality of "gluing" together groups of processes is seen as useful, but perhaps could be replaced with another mechanism.

Release strategy needs revisiting and streamlining.

Steve noted a lack of opportunity during the Sextant test for operator

feedback on applications, including feedback on GUI standards.

B.4 March 26 - 5) Throughput, 6) PSs, Ramps, Sequencer

From hoff@bnl.gov Thu Mar 27 11:34 EST 1997
Date: Thu, 27 Mar 1997 11:35:36 -0500

A meeting was held on Wednesday, March 26 to discuss Sextant experience with data throughput, and with power supplies, ramping and sequencing.

Steve Peggs, Todd Satogata, Jorg Kewisch, Ted D'Ottavio, Don Barton, John Morris, Tom Clifford, George Ganetis, and Larry Hoff were present.

In some cases during the sextant test, network throughput was found to be insufficient.

Perhaps more importantly, application developers were not provided with guidance in choosing strategies for maximizing communication efficiency.

Jorg pointed out that such strategies should keep in mind the object-oriented nature of the application programs, and should not force awkward programming paradigms.

Steve once again expressed chagrin in the lack of definition of the important communication parameters and their values.

Jorg then acted as "facilitator" to guide discussion on Sextant experience with various aspects of power supply application software.

The WFG is not currently capable of performing 24 bit multiplication without loss of precision. This caused some grief during sextant test.

The piecewise linear approximation of the energy ramp used 128 steps and achieved a worst-case error of .01%. An enhanced algorithm might reduce that error by a factor of two or so. It is still not clear what the required maximum error is, or how best to achieve that requirement.

The magnet save/restore was reasonably successful, although the system was only in an embryonic state. The "manager does archive" paradigm seemed appropriate. This allows the sequencer or other archive application to operate independently of the magnet application.

Save/Restore was not tested with other systems. A more global characterization of the save/restore may be necessary, e.g. to include RF settings. The AGS and/or Tevatron experience in this area may prove useful.

Jorg pointed out various positive and negative experiences with application displays. Among the negatives were :

* Poor navigation (next page) tools.
* Often a lack of "expert mode" button.
* Poor integration of communication needs and display mode.
* User (rather than application) often forced to diagnose and repair error conditions.
* More help couldn't hurt.

B.5 March 28 - 7) Cryo & Vacuum, 8) Database usage

From hoff@bnl.gov Fri Mar 28 14:22 EST 1997
Date: Fri, 28 Mar 1997 14:24:16 -0500

A meeting was held on Friday, March 28 to discuss Sextant experience with database usage, and cryo/vacuum/ power supply experience with the control system.

Steve Peggs, Todd Satogata, Garry Trahern, Ted D'Ottavio, Don Barton, John Morris, Tom Clifford, George Ganetis, and Larry Hoff were present.

Garry Trahern acted as an invited guest speaker to lead a discussion about Sextant experience with database usage.

FEC configuration did not come from the DB, although much of the information is resident in databases. All "high level" systems did use the database.

Managers used database information on startup. Some managers read data from files created by the database, other accessed the database directly. Both schemes seemed to work fine. In both cases, the database was not queried after manager startup, the manager acted as a data server to the application program.

When managers used the database online, they opened a connection, read the data, then closed the connection. In the future it might be desirable to maintain an open connection. There was no attempt during

sextant to measure the time to open/close a database connection.

WWW access to DB information was very useful, but somewhat limited.

Storage space was lightly used, but the database was not used for routine data archiving during the sextant.

BPM data integrity was a problem, due to immature or poorly followed data entry procedures.

It became crucial to link applications to the proper libraries. This meant setting up a somewhat non-standard environment for some applications.

Then George Ganetis lead a discussion about cryo/vaccum/power supply experience with the control system.

Some of the problems that have been previously addresses came up, such as data throughput, pet reliability, and FEC reliability.

The data logging scheme developed by the magnet power supply group worked for the most part, but had some troubles, apparently correlated with high network usage times.

The needs of the magnet power supply group for data throughput, and data storage were somewhat underestimated.

The magnet power supply group was not always informed of software changes.

There needs to be ongoing dialog between developers of FEC (and application) software and the controls group, so that any such troubles can be eliminated.

The vacuum group felt the need for a better plotting program.

The simple communication scheme to transmit data from the control system to the cryo system seemed to work for the sextant, but a more elegant scheme might be more desirable.

B.6 April 2 - 9) Logging, 10) Plotting

From hoff@bnl.gov Sun Apr 6 22:58 EDT 1997
Date: Sun, 06 Apr 1997 22:56:11 -0400

A meeting was held on Wednesday, April 2 to discuss Sextant experience with data logging and plotting.

Jorg Kewisch, Todd Satogata, Don Barton, Steve Peggs, Garry Trahern, George Ganetis, Jon Laster, and Larry Hoff were present.

Jon Laster acted as facilitator, to guide discussion of Sextant experience with the data logging system.

Jon outlined the architecture of the logging system as used during the sextant test. The components included a script, which used several underlying programs. The script used the adoIf command line interface to retrieve ADO parameters, the SDDS package to store, correlate and plot the values, and a GUI to create and execute the arcane DDS commands. The logging facility was configured via files containing ADO parameter names. The organization and editing of the files was performed by a centralized facility (Jon Laster). The mechanisms for organizing the logging facility were invisible (and essentially unavailable) to the end user. The logging facility was used to log data from vacuum devices, cryo devices, and to monitor FEC temperatures. Data was timestamped using "system" time (1-second resolution), and was collected at a 1-minute interval. The data was stored in files, with a total of 1.2 gigabytes of data stored during the Sextant test. No attempt was made to move older data to off-line storage. Errors in data collection were logged by storing a timestamped "special value", so that the plotting program could ignore the data, but also so that statistics could be collected about system up time. Data was intentionally not stored in a SYBASE database, although Jon hinted that certain correlation operations might be performed better via a relational database than via SDDS.

From the user's perspective, the sextant experience was largely positive. Only one shortcoming was mentioned. The logging facility is not capable of plotting parameters versus "external" data, such as position in the beamline, or an external time base.

Steve praised the centralized organization of the logging facility. Don cautioned that there needs to be a certain amount of flexibility, especially during development efforts.

Steve said that the user's main concern is whether the data is available, and can be used to make presentation-quality graphs. This

was true for the Sextant test, but required the support of certain data translation utilities.

Steve then acted as facilitator to lead discussion of "plotting". Plotting is defined as data taking at speeds greater than about 15 Hz, and typically displaying the data transiently.

The general-purpose application "pet" was pressed into service in some cases (acting as a MADC "digital scope"). Pet suffered from an inability to store plotting setup parameters, and the lack of a time base. A universal timestamp, had it been available, could have been used to solve the latter problem, as well as allowing correlating parameters across different FECs.

Some specialized applications were developed to fulfill the Sextant need for power supply and quench detection plotting. No general purpose plotting application was available for Sextant.

B.7 April 4 - 11) Error/Fault handling

From hoff@bnl.gov Wed Apr 9 16:46 EDT 1997
Date: Wed, 09 Apr 1997 16:48:23 -0400

The final meeting of the Sextant post-mortem committee was held on Friday, April 4. The topics for this meeting were errors, faults, diagnostics, and recovery.

Todd Satogata, John Morris, Don Barton, George Ganetis, Steve Peggs, and Larry Hoff were present.

Larry acted as facilitator, guiding the discussion. Larry separated errors into several categories, and discussed the Sextant experience with each category, and the Sextant experience with attempts to detect, report, and prevent errors.

The AGS alarm system was used to log "alarm" conditions during the Sextant test. This included FEC reboots. This was judged to be a somewhat reasonable way of collecting FEC statistics.

There was considerable discussion about the lack of an "action please" system such as is already in place for AGS operations. For the sextant test, "action please" requests were made on the "white board" alongside all other categories of errors.

There was also considerable discussion about making use of existing

error MCR reporting mechanisms, such as the Operations Support Group. George Ganetis pointed out that the lengthy startup or shutdown periods necessary for RHIC are unlike what is typical for the AGS. Therefore MCR- based mechanisms may not be useful during these periods.

Finally there was discussion of measures taken to prevent or recover gracefully from errors. The System Monitor application was used to ensure that managers were running, but not FECs. FECs had some dependencies on the development file server, but consoles should not have (although this was not rigorously tested).