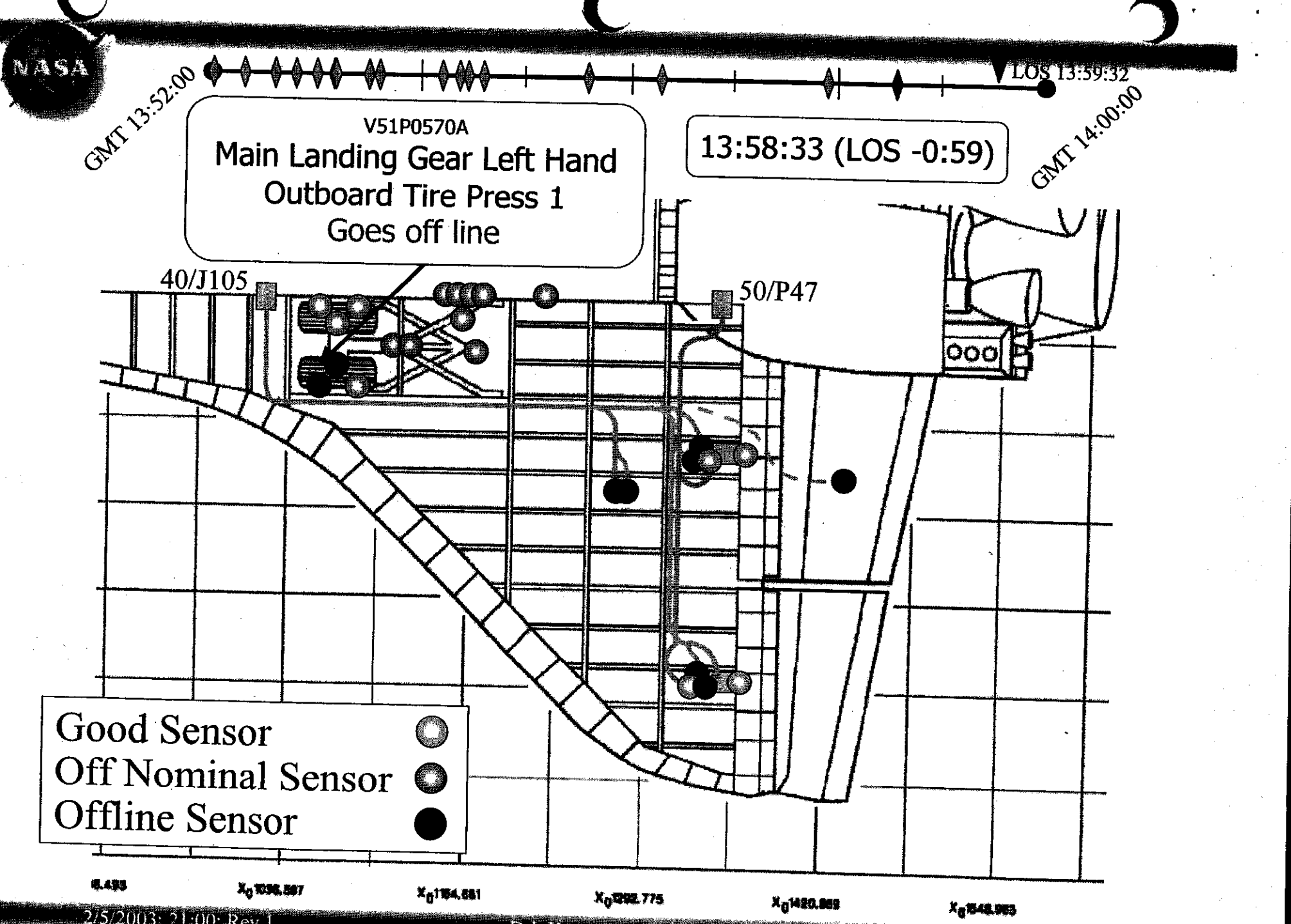
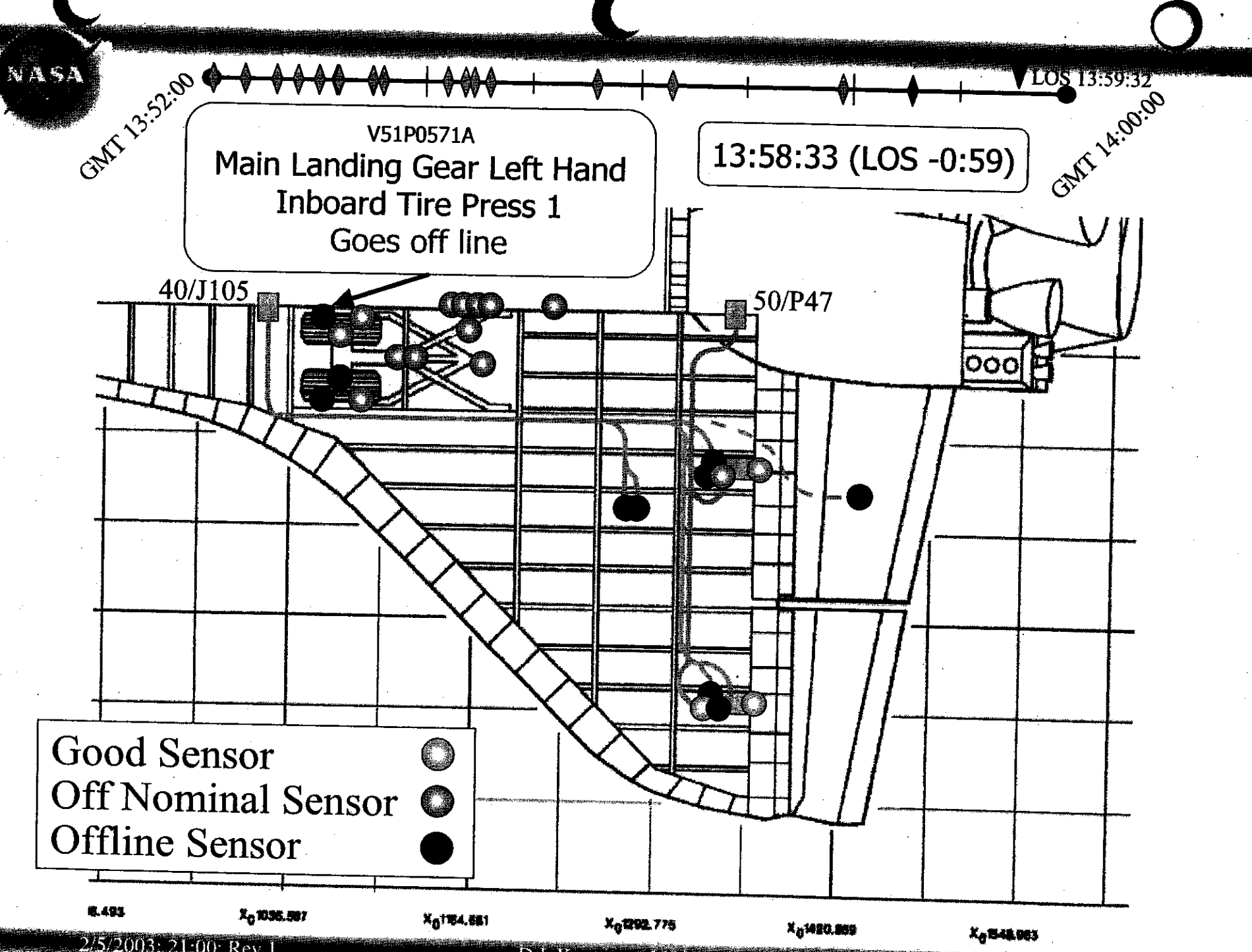

GMT 13:52:00
LOS 13:59:32
GMT 14:00:00
V51P0570A
Main Landing Gear Left Hand
Outboard Tire Press 1
Goes off line
13:58:33 (LOS -0:59)
40/J105
50/P47
Good Sensor
Off Nominal Sensor
Offline Sensor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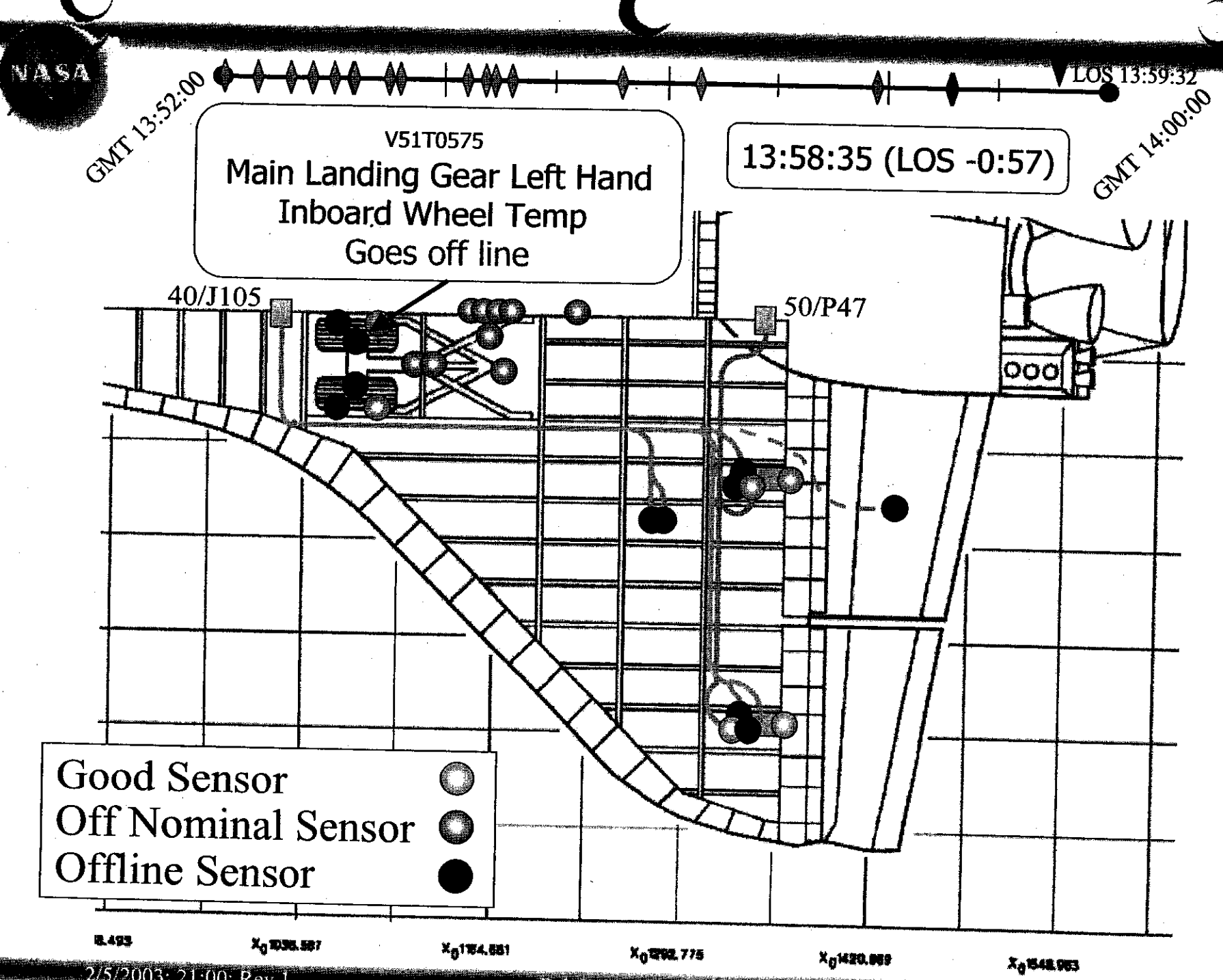
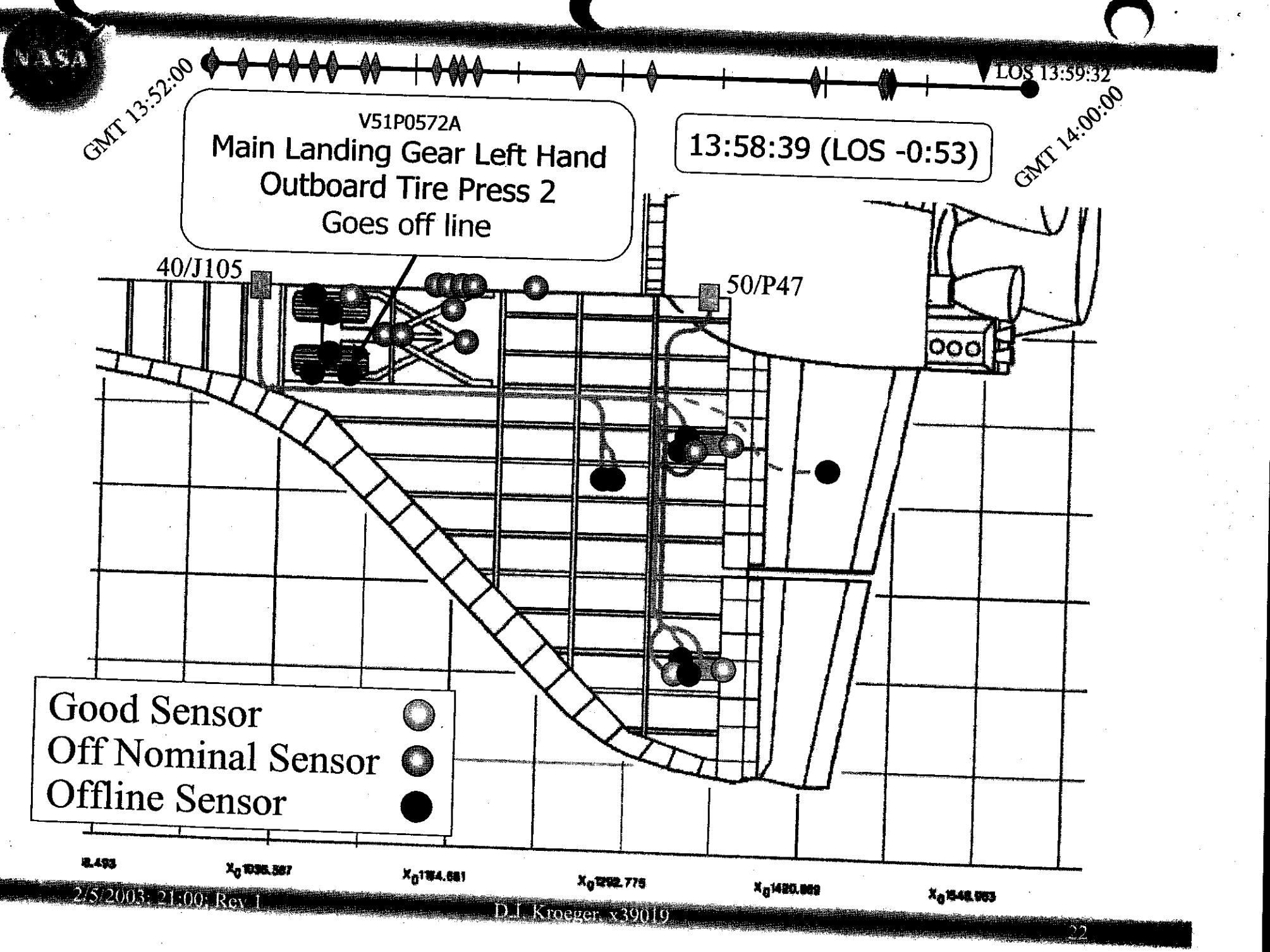
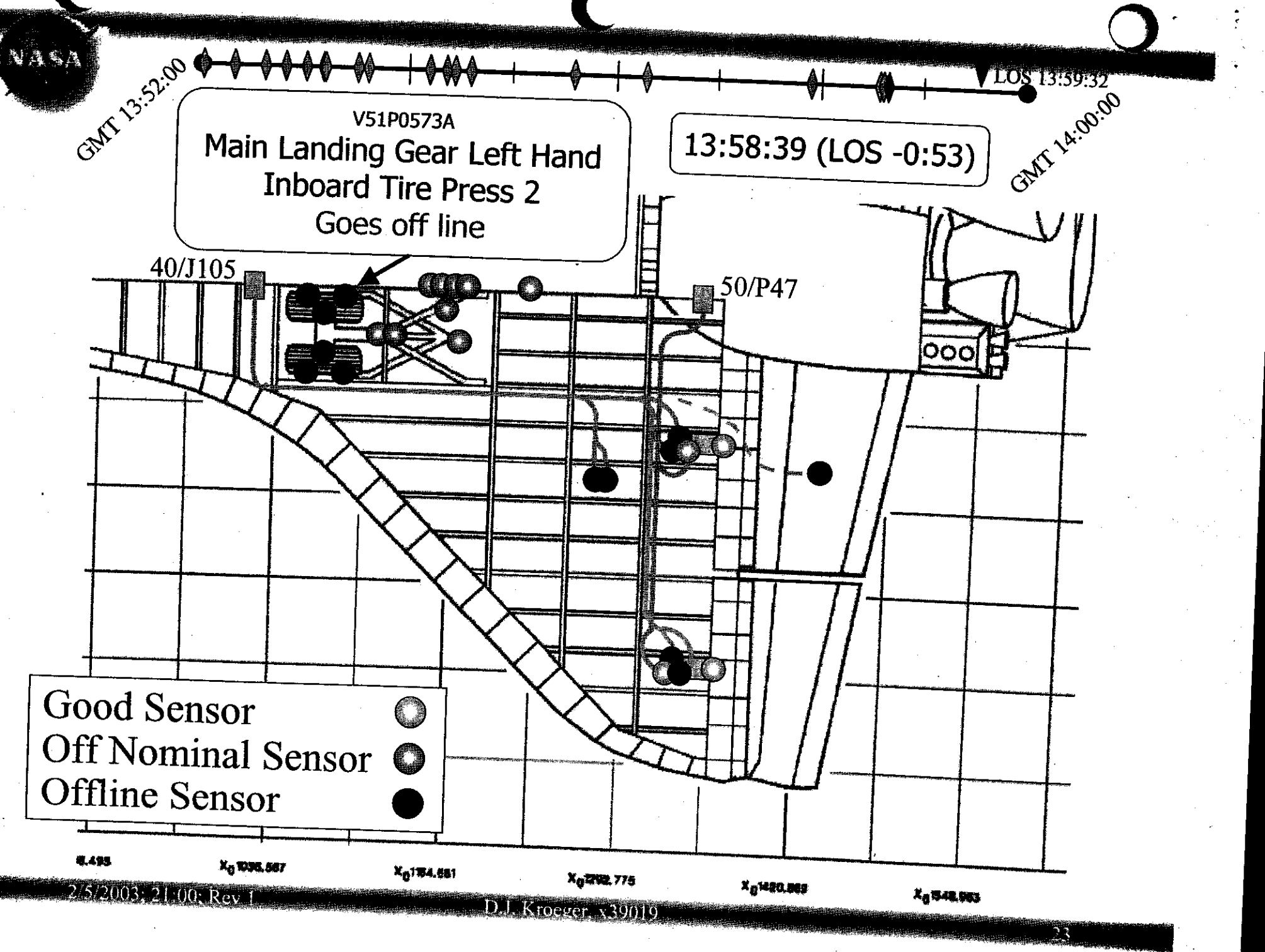
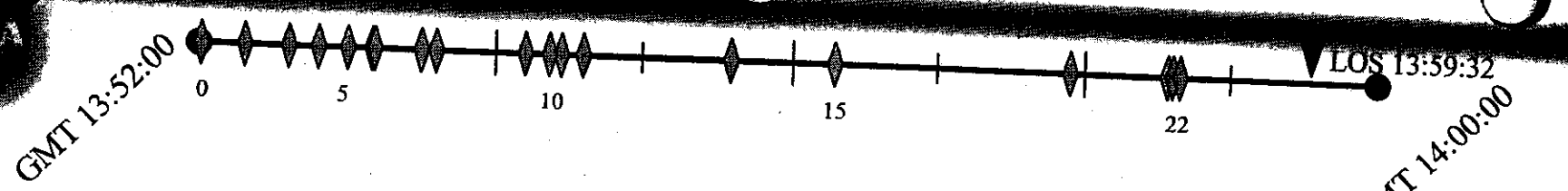
LOS 13:59:32
GMT 14:00:00
V51P0571A
Main Landing Gear Left Hand
Inboard Tire Press 1
Goes off line
13:58:33 (LOS -0:59)
40/J105
50/P47
Good Sensor
Off Nominal Sensor
Offline Sensor


GMT 13:52:00
LOS 13:59:32
GMT 14:00:00
V51T0575
Main Landing Gear Left Hand
Inboard Wheel Temp
Goes off line
13:58:35 (LOS -0:57)
40/J105
50/P47
Good Sensor
Off Nominal Sensor
Offline Sensor

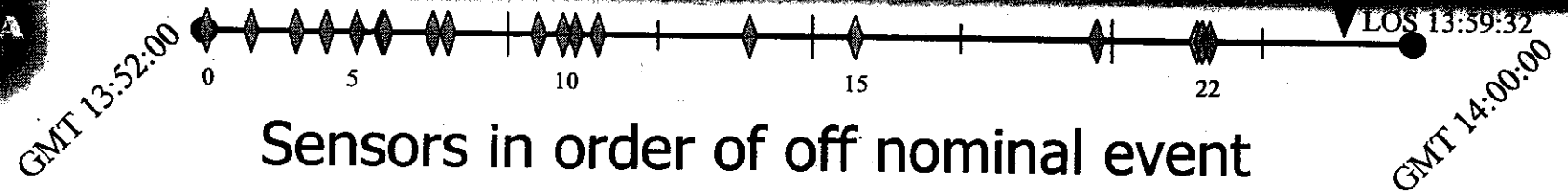

GMT 13:52:00
LOS 13:59:32
GMT 14:00:00
V51P0572A
Main Landing Gear Left Hand
Outboard Tire Press 2
Goes off line
13:58:39 (LOS -0:53)
40/J105
50/P47
Good Sensor
Off Nominal Sensor
Offline Sensor


GMT 13:52:00
LOS 13:59:32
GMT 14:00:00
V51P0573A
Main Landing Gear Left Hand
Inboard Tire Press 2
Goes off line
13:58:39 (LOS -0:53)
40/J105
50/P47
Good Sensor
Off Nominal Sensor
Offline Sensor

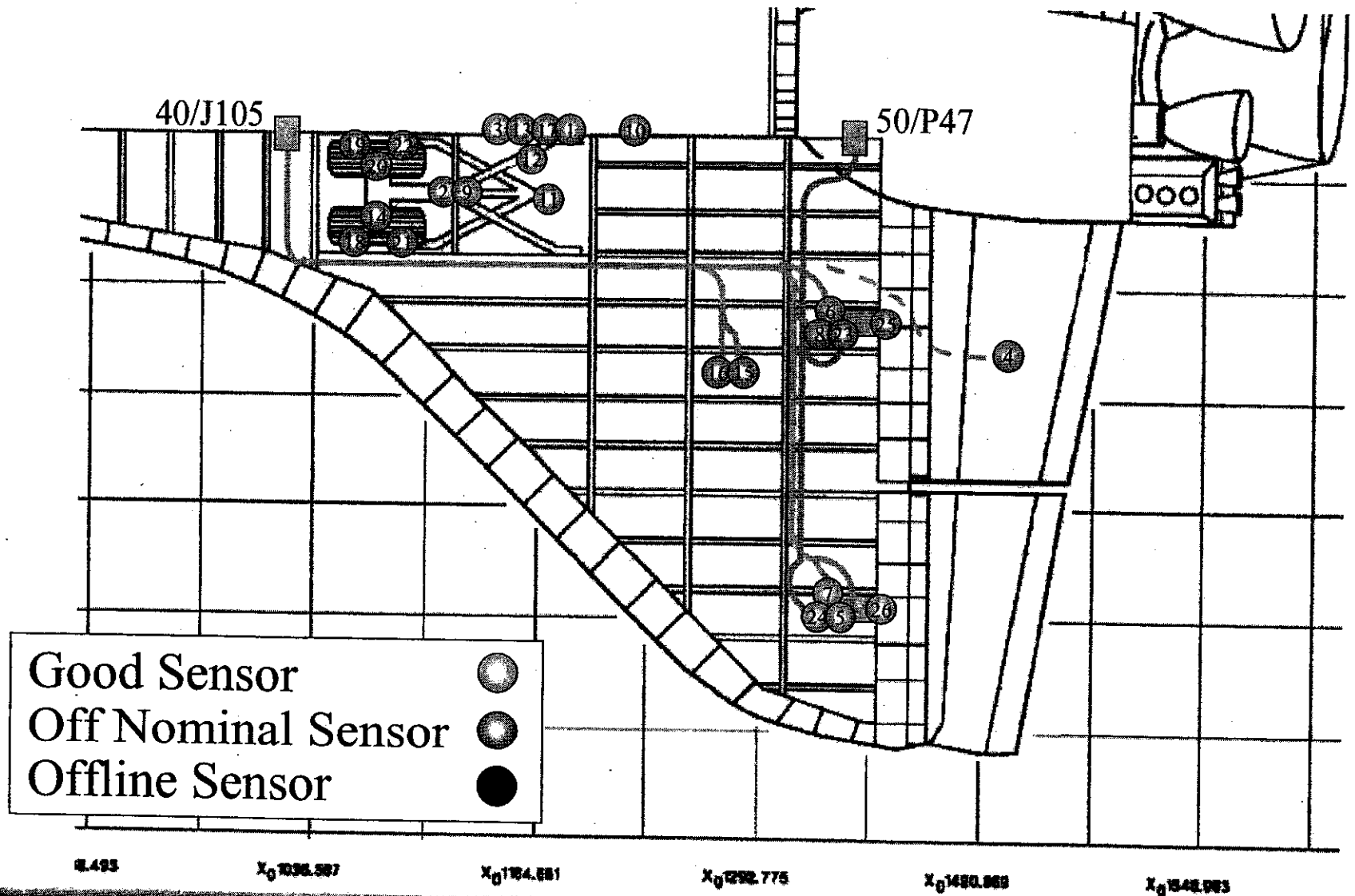


Sensor Names and MSIDs (in order of off nominal event)

No.	Measurement Nomenclature	MSID	No.	Measurement Nomenclature	MSID
1	LMG Brake Line Temp D	V58T1703A	14	MLG LH Outbd Wheel Temp	V51T0574A
2	LMG Brake Line Temp A	V58T1700A	15	LH UPR Wing Skin Temp	V09T1024
3	LMG Brake Line Temp C	V58T1702A	16	LH LWR Wing Skin Temp	V09T1002
4	LH Inbd Elev LWR Skin Temp	V09T1006	17	Hyd 2 LH Aft Brake Sw Vlv Rtn Ln T	V58T0841A
5	Hyd Sys 3 LOE Rtn Ln T	V58T0394A	18	MLG LH Outbd Tire Press 1	V51P0570A
6	Hyd 1 LH Inbd Elvn Actr Rtn Ln T	V58T0157A	19	MLG LH Inbd Tire Press 1	V51P0571A
7	Hyd Sys 1 LOE Rtn Ln T	V58T0193A	20	MLG LH Inbd Wheel Temp	V51T0575A
8	Hyd 2 LH Inbd Elvn Actr Rtn Ln T	V58T0257A	21	MLG LH Outbd Tire Press 2	V51P0572A
9	LMG Brake Line Temp B	V58T1701A	22	MLG LH Inbd Tire Press 2	V51P0573A
10	M-Fus Lt BL Temp at 1215	V34T1106	23	Hyd Sys 3 LH Inbd Elvn Rtn Ln Temp	V58T0833A
11	L Main Gear Strut Actuator Temp	V58T0405A	24	Hyd Sys 2 LH Otbd Elvn Rtn Ln Temp	V58T0883A
12	Hyd Sys 1 LMG Uplk Actr Unlk Ln T	V58T0125A	25	Hydr Sys LH Inbd Elvn Actr Temp	V58T0830A
13	Hyd 3 LH Fwd Brake Sw Vlv Rtn Ln T	V58T0842A	26	Hydr Sys LH Outbd Elvn Actr Temp	V58T0880A



Sensors in order of off nominal event



X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 11 Feb 2003 18:32:18 -0500
To: Pamela Richardson <prichard@hq.nasa.gov>
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Fwd: Offer of help
Cc: prutledg@hq.nasa.gov, jlemke <jlemke@hq.nasa.gov>

Here's an offer of services.

X-Sender:
Date: Tue, 11 Feb 2003 17:16:48 -0600
To: jlloyd@hq.nasa.gov
From:
Subject: Fwd: Offer of help
Cc:

Hi Jim,
We haven't talked in a while but I thought that I would forward this to you also in case there was any analyses you need for the Columbia accident. We have also sent it to our contacts at MSFC.

Also, we at APT are continuing to push the state of the art in risk based analyses and decision making and would like to give you an update sometime when we are in DC. Pete and I come up every month or two.

I hope things are well with you.

From: '
To: '
Subject: Offer of help
Date: Tue, 11 Feb 2003 14:54:35 -0600
X-Priority: 3 (Normal)
Importance: Normal

We at APT Research have strong analytical capabilities in the areas of debris prediction, fault tree analysis, reliability analysis, and process flow analysis. Our models for predicting the ground hazard from de-orbiting debris use methods we developed for the Natoinal Ranges and are at the state of the art in safety modeling.

We have frequently been used as an independent source for safety analysis. As such, we are comfortable with the analysis of systems and processes where we were not a part of the original design team. If you see a need for such a capability for the Shuttle program, we could provide a truly independent look at the processes and analyses that are being used to examine the Columbia disaster.

We are available to provide assistance in any way that we can.

APT Research

Jim

X-Sender: jmullin@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Sun, 09 Feb 2003 09:56:52 -0500
To: prichard@hq.nasa.gov
From: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>
Subject: Fwd: RE: FW: updated version of the general guidelines for field team PPE

More historical data. Jon

X-Sender: dthomas1@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Fri, 07 Feb 2003 13:52:35 -0500
To: "Catherine M. Angotti" <cangotti@hq.nasa.gov>
From: Daniel Thomas <dthomas1@hq.nasa.gov>
Subject: RE: FW: updated version of the general guidelines for field team PPE
Cc: Guy.Camomilli-1@ksc.nasa.gov, jmullin@hq.nasa.gov

As I told Guy, I agree that the HCAT is the proper channel for all of this type of information. Sorry for creating any confusion.

Dan

At 01:06 PM 2/7/2003 -0700, Catherine M. Angotti wrote:

Dan,

Don't mean to jump in on this, but this info was provided to the H-CAT as directed by O'Keefe and Gregory. Code AM has also provided to Safety who has disseminated through their ranks, but I cannot comment as to whether this has gone to the CAC, the Public Affairs, action clearing house. If this is a requirement it needs coordination.

Cathy

Guy,

Thanks for sending me that information. Have these guidelines have been passed to PAO and the field teams in TX and LA?

Dan

At 08:03 AM 2/7/2003 -0500, Camomilli-1, Guy wrote:

Dan,

Let's hope for the best. Attached are guidelines for "lay people". I hope this helps. Feel free to contact me if you have any questions.

Guy Camomilli, MPH, CSP
Senior Environmental Health Officer,
OCHMO Tenant Office
guy.camomilli-1@ksc.nasa.gov

Voice (321) 867-1417
Fax (321) 867-8870

-----Original Message-----
From: Jonathan B. Mullin [mailto:jmullin@hq.nasa.gov]
Sent: Thursday, February 06, 2003 3:20 PM
To: dan.thomas@hq.nasa.gov
Cc: Catherine.Angotti@hq.nasa.gov; Guy.S.Camomilli@nasa.gov
Subject: Fwd: FW: updated version of the general guidelines for field team PPE

Dan, I got a call from ARC, Bob Dolchi concerning STS 107. He told me that some Californians have been transporting parts via their cars. If there are claims from these in the future, heads up. Enclosed again are the preferred practices for handling debris from Code AM.
Regards, Jon
Date: Thu, 06 Feb 2003 15:12:20 -0500
To: bob-dolci
From: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>
Subject: Fwd: FW: updated version of the general guidelines for field team PPE
Cc: Clark Hunt,guy-camomilli,Frank-Mortelliti,eric_fuller,Tom-Ambrose,HCAT@hq.nasa..gov,lemke-john,dave-king,hulet-mike,Richardson_Pamela,Lloyd_James
Bcc: Mullin_Jonathan

These are the preferred IH practices for recovery. I will copy Guy Camomilli on this transmission. Please contact Bob Gafney as he is the center for all Debris information for the MIB.
Regards, Jon
Date: Wed, 05 Feb 2003 12:31:10 -0500
To: john-piasecky
From: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>
Subject: Fwd: FW: updated version of the general guidelines for field team PPE
Cc: mike stevens
Bcc: Dan-Thomas,Lloyd_James,lemke-john,Frazier_Wayne,Tom Ambrose <Tom.Ambrose@dfrc.nasa.gov>,Mullin_Jonathan,Harkins_Wilson,guy-camomilli,Dr.Bill-Barry,Angotti-Cathy, Martha-Wetherholt

John, incase your teams would like to know the recommended personnel protective equipment guidance provided by a team of "Industrial Hygienists" the enclosed is provided. The source of the guidance is Code AM. Regards, Jon
X-Sender: jmullin@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2

Date: Wed, 05 Feb 2003 12:07:11 -0500
To: jlemke@hq.nasa.gov
From: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>
Subject: FW: updated version of the general guidelines for field team PPE
Cc: Wayne Kee <Wayne.Kee-1@ksc.nasa.gov>, whill@hq.nasa.gov, prutledg@hq.nasa.gov, Catherine.Angotti@hq.nasa.gov, rwillia3@mail.hq.nasa.gov, snakamur@ems.jsc.nasa.gov, HCAT@hq.nasa.gov, jlloyd@hq.nasa.gov, prichard@hq.nasa.gov, wfrazier@hq.nasa.gov, dan.thomas@hq.nasa.gov, dloyd@wstf.nasa.gov

John, for the NASA Record, the enclosed General Guidelines were issued by Code AM.
Both Codes AM and QS are unsure of where the other, not attached to this correspondence, "one page guidance" came from to advise Public Service Personnel.
The Code AM enclosed guidance is more reliable guidance to Public Service Personnel due to the fact that a "team of Industrial Hygienists" have developed this product.
Regards, Jon

4 February 2003

>
> GENERAL GUIDELINES FOR PERSONNEL HEALTH PROTECTION FOR FIELD TEAMS DURING RECOVERY OF SHUTTLE DEBRIS
>
> The following recommendations are provided for personnel health protection for field teams assigned to pick up debris / materials associated with the Columbia accident. These protection guidelines are for activities including investigation, recovery, and cleanup operations. Additional guidelines may be provided for other downstream activities such as working in Shuttle debris staging areas and/or handling cataloged items.
>
> The appropriate personal protective equipment (PPE) to be used by personnel will depend on the task to be performed and proximity to debris containing hazardous material. A tiered approach to protective clothing selection is provided to allow for ease of implementation. The proper protective clothing for preventing /minimizing potential personnel exposure to hazardous materials and adequate control areas should be coordinated with the on-site health and safety supervisor. Coordinate with the NASA Recovery Team Command Post if there are any questions with this guidance. The on-site NASA JBOSC Environmental Health/Industrial Hygiene Office (EH/IH) representative supporting the recovery team may be contacted through the NASA Recovery Team Command Post if additional technical guidance is requested.
>
> a. Level A - This level of protection is to be used when exposure (potential for contact with Liquid Propellants) to hypergolic propellants (e.g. hydrazines and dinitrogen tetroxide) is a hazard. Only NASA/Contractor qualified employees should

enter areas with hypergolic propellants present in EPA Level A equivalent protection with positive pressure SCBA suit/gloves made with hypergolic propellant protective /compatible materials or Propellant Handlers Ensemble (PHE),(SCAPE). Consult with NASA Recovery Team Command Post.
>
> a. Level B - This level of protection can be used during entry into an area where potential exists for depleted oxygen levels or when ammonia, Freon, hypergolic vapor or other inhalation hazards are present.>
>
> a. Level C1 - Personnel should use full face respirators equipped with High Efficiency Particulate Air (HEPA) filters, Disposable coveralls (hooded Tyvek suits over coveralls), Cut-resistant leather gloves, Disposable coverall sleeves should be taped over gloves to prevent fibers from lodging under clothing, Disposable booties or boot covers over safety shoes, and an article of clothing to protect neck area under face. Examples of these tasks would include uncontrolled inhalation hazard from dusty material (e.g. handling friable TPS materials or burned graphite composite in which dust is produced).
>
> Note: Level C1 may be downgraded to Level C2 if dust is suppressed by using wetting agents or encapsulants, (e.g. spray-on floor wax and glue).
>
> Level C2 - Personnel should use disposable respirators (HEPA, N100 or N95), disposable coveralls (Tyvek suits), heavy leather gloves, disposable booties or boot covers over safety shoes, and safety glasses with side shields or goggles.
>
> Level C2 protection would be for tasks with less potential for disturbance of composite-containing debris. Examples of these tasks would include picking up larger pieces of wetted TPS debris or disturbing it in any other way.
>
> a. Level D - Personnel should use leather gloves and a disposable dust mask or N95 (optional). Level D protection would be for tasks with minimal potential for debris disturbance (dust unlikely). Examples would include picking up metal fragments or small pieces of TPS material.
>
> Proper protective clothing requirements should be coordinated with the on-site health and safety representatives on a daily basis. Under all circumstances, the disturbance of debris should be minimized to avoid creating airborne particulates.
>
> The following materials may pose potential health hazards when encountering Shuttle debris:
>
> 1. Metals
> * Aluminum - Boron Truss
> * These materials should be in a solid minimum hazard state.
> * This material must be inhaled or ingested to exhibit toxic effects.
> * Handle with leather gloves. Wash with soap and water if skin contact.
> * Level D PPE is recommended.
> * Epoxy-Boron Truss
> * These materials should be in a solid minimum hazard state.

> * This material must be inhaled or ingested to exhibit toxic effects.
> * Handle with leather gloves. Wash with soap and water if skin contact.
> * Level D PPE is recommended.
> * Beryllium
> * Found in windshield frame and external tank doors
> * Must be inhaled or ingested to be a hazard
> * Should be found in a solid minimum hazard state.
> * Handle with leather gloves. Wash with soap and water if skin contact.
> * Level D PPE is recommended. If material is oxidized, PPE level upgrade should be considered.
>
> 1. Hypergolic Propellants
>
> Debris suspected of containing hypergolic propellants should be examined upwind at a distance. Items potentially containing liquids or vapors of hypergolic propellants would probably be tubing, thrusters, piping, tubing/piping fittings, and vessels. If hypergolic propellants are present, the debris may be approached by NASA/Contractor qualified personnel in Level A or equivalent. Calibrated monitoring equipment should be used to determine hypergolic vapor concentrations. If no hypergolic vapors are detected, the site health and safety supervisor may downgrade PPE taking into consideration the pH of the material.
> Parts and materials contaminated with propellants that have been > "> bagged> "> may off-gas slowly in the bag or container used for storage and shipping. Caution should be used when opening bags known or suspected to have been contaminated with propellants. Open the bags under a laboratory fume hood, and/or with proper PPE.
>
> * Hydrazine, monomethyl hydrazine, and Nitrogen tetroxide (Hypergolic Propellants)
> * Forward and Aft reaction control system (RCS), Auxiliary Power Unit (APU), and Orbiter Maneuvering System (OMS)>
> * > Only NASA/Contractor qualified employees should enter areas with hypergolic propel> lants present in OSHA Level A Protection with suit/gloves made with hypergolic propellant protective /compatible materials or Propellant Handlers Ensemble (PHE), (SCAPE)
> * Valves are designed to fail closed, assume all tubing to be contaminated with hypergolic propellant.
> * Appropriate control zones should be established to prevent exposure to unprotected personnel. Vessels under pressure should also be taken into consideration while establishing the control zone.
> *
> * 3. Cryogens
> *
> * Liquid Hydrogen (LH2)and Liquid Oxygen (LO2)
> * Heavy leather gloves are appropriate PPE for handling.
> * See on-site Health and Safety supervisor for site-specific recommendations.
> *
> * 4. Refrigerants
> * Ammonia

> * - Orbiter coolant system. Ammonia vapors may be irritating to eyes and upper respiratory system.
> * Utilize Level B (Self-contained breathing apparatus and skin protection) for unknown concentrations during initial characterization.
> * Consult with on-site health and safety representative for appropriate PPE.
> * Dichloromonofluoromethane (Freon 21)
> * Orbiter coolant system. May displace oxygen in enclosed or poorly ventilated areas.
> * Utilize Level B (Self-contained breathing apparatus and compatible gloves) in enclosed areas.
> * Consult with on-site safety representative for appropriate PPE.
>
> 5. Thermal Protection System (TPS) Materials:
> * Silica and other refractory fibers may be found in Shuttle tiles, blankets used on exterior Shuttle surfaces and payload bay, gap fillers, thermal barriers, heat shields.
> * The principal acute hazards of TPS materials are eye, skin and upper respiratory (depending upon particle size) tract irritation. Irritation and abrasion, similar to that of glass fibers may occur.
> * The level of PPE should be based on the task being performed, friability of the material and environmental conditions. Coordinate proper selection with site health and safety supervisor.
>
> 5. Helium Pressure Systems
> * Forward and Aft Reaction Control System (RCS) 13 gallon helium tanks (6 tanks)and Orbiter Maneuvering System (OMS) 130 gal helium tanks (2 tanks)
> * See site health and safety supervisor for safety precautions.
>
> 5. Ordnance
> * Ordnance is located in the following areas of the Shuttle: Wheel well in main landing gear, Drag chute compartment, Main hatch, KU-Band Antenna, Emergency Egress Window, Fire extinguisher tanks
> * See site health and safety supervisor for safety precautions.
>
> 5. Other Chemicals
>
> Recovery teams should remember that various sizes of pressurized vessels used for Shuttle experiments may be present in the debris. These vessels, although small, may be highly pressurized, and should be handled with care. Coordinate with health and safety supervisor.
>
> GENERAL RECOMMENDATIONS:
>
> 1. Appropriate decontamination procedures must be followed to prevent transport of dusty debris from the work area. Donning/ doffing PPE should be performed in a clean area. Procedure to be posted at site.
>
> 2. If debris is contaminated with carbon/graphite fibers (burned graphite/composite), personnel exiting a controlled zone should use a wet/dry HEPA

vacuum (if present) to decontaminate outer clothing prior to removal. Procedure to be posted at site.
>
> 3. Contaminated PPE should be disposed of in appropriate bags/containers.
>
> 4. Respirators should be wet wiped on the outside and wipes disposed of properly. Respirators may not be left in potentially contaminated areas. The inside of the respirator should not be exposed to composite materials. This could result in skin irritation around facial area. Additionally, gloves should not be left in potentially contaminated areas. Disposable respirators should be discarded in appropriate bags/containers. Follow normal respirator cleaning and disinfecting protocol.
>
> 5.> > Personnel should wash their hands and face when leaving a controlled work area and should wash their hands, forearms, and face prior to eating, drinking, or > smoking. Personnel should shower prior to going home when possible. Where possible a portable eyewash providing fifteen minutes of flow should be on site.
>
> 6. Respirator filters should be replaced whenever they are damaged, soiled, or causing noticeably increased breathing resistance (e.g., causing discomfort to the wearer). Use of protective clothing, including respiratory protection, must be used in accordance with the manufacturer's recommendations. Use of respiratory protection must be in accordance with 29 CFR 1910.134. If other respiratory protection such as organic vapor, ammonia, or other applications are needed consult with an industrial hygienist.
>
>
> Guy Camomilli, MPH, CSP
> Senior Environmental Health Officer,
> OCHMO Tenant Office
> guy.camomilli-1@ksc.nasa.gov
> Voice (321) 867-1417
> Fax (321) 867-8870
>
>

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Office of the Chief Health and Medical Officer

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James Lloyd, 08:27 AM 2/13/2003 -0500, ASAP minutes in regard to concerns of MMOD Damage a

X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Thu, 13 Feb 2003 08:27:12 -0500
To: salexand@hq.nasa.gov, elvia h thompson <ethompso@mail.hq.nasa.gov>,
cac <cac@hq.nasa.gov>, hcat@hq.nasa.gov, jmannix@hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: ASAP minutes in regard to concerns of MMOD Damage and
Mitigating Responses to Threat
Cc: wfrazier@mail.hq.nasa.gov, jlemke <jlemke@hq.nasa.gov>,
prutledg@hq.nasa.gov, mark Kowaleski <mkowales@hq.nasa.gov>,
prichard@hq.nasa.gov

Not sure who is now leading the collection of reports that may instigate questions but here is one that is in the public domain and has information on MMOD risks.

http://www.nap.edu/books/0309059887/html/index.html

X-Sender: wfrazier@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Wed, 12 Feb 2003 07:08:52 -0500
To: James Lloyd <jlloyd@hq.nasa.gov>
From: "Wayne R. Frazier" <wfrazier@hq.nasa.gov>
Subject: Re: ASAP minutes
Cc: jlemke@hq.nasa.gov, mkowales@mail.hq.nasa.gov, wbihner@hq.nasa.gov,
lsirota@hq.nasa.gov

Yesterday, I received from Nick Johnson a fax of Tommy Holloway's response to the 1997 NRC Report concerning the risk of OD damage to the orbiter. The report chaired by Rick Hauck, former astronaut and now a DC area space insurance executive, is very prophetic when is comes to some of the risk scenarios I have read about in the paper.

http://www.nap.edu/books/0309059887/html/index.html

W

At 06:22 PM 2/11/2003 -0500, you wrote:
Len,

I have excerpted a section from the November 7, 2002 minutes of the open ASAP meeting at Houston. These minutes are on the web site and freely open to public. Buried very carefully in the Aviation Safety section (:>)) you can find a reference to the need to do more fact finding on on-orbit repair capability in the face of the enhanced risk of MMOD damage on extended duration stays. This is what the AP reporter wants to interview someone about. Elvia Thompson, PAO, says the reporter is also looking for the NASA response to this. Since it isn't even a recommendation, let alone a report to NASA, I suspect people have not had a chance to even know that

this observation/need to fact find even exists. The entire report is 7 pages in length and is a PDF located at:

http://www.hq.nasa.gov/office/codeq/asapmeet/11_7_2003.pdf

Messrs. Goranson and Guiterrez are the ASAP members with the stated interest.

Aviation Safety
Mr. Gutierrez discussed the continuing Panel concern about who the Center Aviation Safety Officers report to. The ASAP has consistently taken the position that the ASO should report directly to the Center Directors. NASA does not have a consistent organization across all Centers and does not believe this structure is necessary to have a safe operation. It was agreed that the issue would be closed in the Annual Report with an agreement to disagree.

Mr. Gutierrez also mentioned the SATS program and the no-fly zone concerns as possible issues which would be addressed in the visit to LaRC the following week.

Mr. Goetz noted that Orbital Debris was still an open issue that needed to be addressed. Ms. McCarty wanted the funding status of the JSC capability to be included in the next JSC briefing. Messrs. Goranson and Gutierrez desire more fact-finding about on-orbit vehicle repair techniques and characteristics for extended on-orbit durations.

Mr. Schaufele discussed the common issues of Second Generation launch vehicles, SLI, CRV, CTV and upgrades. The requirements have not been adequately defined, have not considered full lifecycle costs, have not been focused on a long-range NASA vision and have not had adequate focus on safety. The inter-relationship between SLI and CRV/CTV need to be considered as well as the compatibility of the CRV/CTV with EELV's. It was noted that the Integrated Space Transportation Plan, currently under NASA review, would address the requirements of these programs.

Jim

~~~~~~
Wayne R. Frazier
NASA Headquarters - Code QS
Office of Safety and Mission Assurance
Washington,DC 20546-0001
Ph: 202 358-0588 Fax: 202 358-3104
~~~~~~

"Mission success starts with safety"

</x-html>

Jim

X-Sender: jmullin@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 10 Feb 2003 16:48:53 -0500
To: jlemke@hq.nasa.gov
From: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>
Subject: AIR Force Request.
Cc: jlloyd@hq.nasa.gov, prichard@hq.nasa.gov, prutledg@hq.nasa.gov,
wfrazier@hq.nasa.gov

Code QS got a call from AF Space Command Major Robert Ramey, Legal Office. He wanted to know if the NASA DOD Agreement was being used as a citation for the Columbia Investigation. MR. Fraizier and I responded that the Space Act was being used as the authority.
Major Raymey can be reached at 719-554-5494. His FAX is 719-554-9095 and email is robert.ramey@peterson.af.mil
Major Ramey indicated he would like a copy of the appointment letter, which QS replied we could should send it through our NASA Liason at Peterson AFB, Mr. Newbury.
Regards, Jon

Jonathan B. Mullin
Manager Operational Safety
Emergency Preparedness Coordinator
Headquarters National Aeronautics and Space Administration
Phone (202) 358-0589
FAX (202) 358-3104
"Mission Success Starts with Safety"

X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 10 Feb 2003 17:55:15 -0500
To: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>, jlemke@hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Re: AIR Force Request.
Cc: prichard@hq.nasa.gov, prutledg@hq.nasa.gov, wfrazier@hq.nasa.gov

Why would we use the DOD memo as a citation for investigation of a loss of a Shuttle? The memorandum is to be used as a citation for sharing information and requesting support but all that had been done as part of the establishment of the Standing Board which I recall may have used the DOD/NASA agreement. What this infers is anyone's guess.

At 04:48 PM 2/10/2003 -0500, Jonathan B. Mullin wrote:
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Jim

X-Sender: jmullin@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 11 Feb 2003 07:45:09 -0500
To: James Lloyd <jlloyd@hq.nasa.gov>
From: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>
Subject: Re: AIR Force Request.
Cc: jlemke@hq.nasa.gov, wfrazier@hq.nasa.gov, prichard@hq.nasa.gov, sbrookov@hq.nasa.gov, Daniel Thomas <dthomas1@hq.nasa.gov>

Jim, as I see it the DOD /Agreement is not applicable in this investigation. We have used it on "like systems" investigations, that is common aircraft and common missiles;for example (NASA MSFC) participated in the Titian 4 segment mishap at Ed wards AFB in the 90's.

Code QS returned the call Major Ramey and indicated that the DOD/NASA agreement was not the authority for the investigation, instead the Space Act was the authority.

Learning that fact, last evening the AF requested a "copy of the Board Appointment Letter " signed out by Mr. O'Keefe .
I highly suggest that Code Q elect our legal Code G as the "formal " response agent to the Air Force concerning this matter.
Regards, Jon
At 05:55 PM 2/10/2003 -0500, you wrote:
> Why would we use the DOD memo as a citation for investigation of a loss of a Shuttle? The memorandum is to be used as a citation for sharing information and requesting support but all that had been done as part of the establishment of the Standing Board which I recall may have used the DOD/NASA agreement. What this infers is anyone's guess.
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> > Code QS got a call from AF Space Command Major Robert Ramey, Legal Office. He wanted to know if the NASA DOD Agreement was being used as a citation for the Columbia Investigation. MR. Fraizier and I responded that the Space Act was being used as the authority.
> > Major Raymey can be reached at 719-554-5494. His FAX is 719-554-9095 and email is robert.ramey@peterson.af.mil
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> > Regards, Jon

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Jim

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X-Sender: wfrazier@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 11 Feb 2003 07:01:44 -0500
To: stan.newberry@peterson.af.mil
From: "Wayne R. Frazier" <wfrazier@hq.nasa.gov>
Subject: February 2, 2003
Cc: prichard@hq.nasa.gov, jlemke@hq.nasa.gov, jmullin@hq.nasa.gov

stan,

Copy of appointment letter. I am trying to get the charter, either old version or new.
Maj Ramey of the legal office called us.
Wayne


Gehman1.doc

~~~~~~

Wayne R. Frazier
NASA Headquarters - Code QS
Office of Safety and Mission Assurance
Washington,DC 20546-0001
Ph: 202 358-0588 Fax: 202 358-3104

~~~~~~

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X-Sender: jmullin@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Sun, 09 Feb 2003 09:58:18 -0500
To: prichard@hq.nasa.gov
From: "Jonathan B. Mullin" <jmullin@hq.nasa.gov>
Subject: Fwd: RE: EPP 107 Distribution List

For the historical record. Regards, Jon
From: "Camomilli-1, Guy" <Guy.S.Camomilli@nasa.gov>
To: "'Jonathan B. Mullin'" <jmullin@hq.nasa.gov>
Subject: RE: EPP 107 Distribution List
Date: Fri, 7 Feb 2003 13:01:01 -0500
X-Mailer: Internet Mail Service (5.5.2653.19)

Thanks.

Guy Camomilli, MPH, CSP
Senior Environmental Health Officer,
OCHMO Tenant Office
guy.camomilli-1@ksc.nasa.gov
Voice (321) 867-1417
Fax (321) 867-8870

-----Original Message-----
From: Jonathan B. Mullin [mailto:jmullin@hq.nasa.gov]
Sent: Friday, February 07, 2003 12:48 PM
To: Camomilli-1, Guy
Subject: RE: EPP 107 Distribution List

I have them in my book in pen. I will work on that when I have time. Can
you send the latest OSHA REport? Thanks, JonAt 11:57 AM 2/7/2003 -0500, you
wrote:
>Jon,
>
>Thanks for the information. The email addresses will be of use. Is there
>any way to get phone numbers as well?
>
>Thanks.
>
>Guy Camomilli, MPH, CSP
>Senior Environmental Health Officer,
>OCHMO Tenant Office
>guy.camomilli-1@ksc.nasa.gov
>Voice (321) 867-1417
>Fax (321) 867-8870
>
>

>-----Original Message-----
>From: Jonathan B. Mullin [mailto:jmullin@hq.nasa.gov]
>Sent: Friday, February 07, 2003 11:40 AM
>To: Guy.S.Camomilli@nasa.gov
>Cc: Catherine.Angotti@hq.nasa.gov
>Subject: EPP 107 Distribution List
>
>
>Guy, this is my list for Emergency Preparedness which includes a number of
>persons. I was concenred about the distribtuion originally to a wide spread
>group. But as long as the data has been cleared by FEMA, and we do day to
>day work with this same group, it should be good to go. On each
>transmission I will also copy hcat@hq.nasa.gov Any thoughts? Regards, Jon
>Al Phillips
>Annie O'Donoghue
>Art Lee
>Bob Dolci
>cathy-miller
>tsabikos.a.papadimitris.1@gsfc.nasa.gov
>Clark Hunt
>Clyde Dease
>Don Hall
>Eric Fuller
>Ezra Abrahamy
>Fred Battle
>Harold Beazley
>Jack Vechil
>dennis.g.perrin1@jsc.nasa.gov
>john-griggs
>Luke Wilkins
>lyn-Engelbert
>Michael Moore
>Peter Robles
>sonja-alexander
>Stephen Turner
>Terry Potterton
>Tom Ambrose
>Wayne Kee
>turner-bob
>howard-Kass
>Lee_Arthur
>Dr.Bill-Barry
>olga-dominguez
>Catherine.Angotti@hq.nasa.gov
>mmcneill@mail.hq.nasa.gov
>tspagnuo@pop200.gsfc.nasa.gov
>Patrick.A.Hancock.1@gsfc.nasa.gov
>Jim.Carter@msfc.nasa.gov
>Edwin.Jones@msfc.nasa.gov

>john.rodgers@hq.nasa.gov
>bnotley@mail.arc.nasa.gov
>gregory.l.ellis.1@gsfc.nasa.gov
>t.f.middleton@larc.nasa.gov
>william.c.roeh1@jsc.nasa.gov
>phillip.j.nessler.1@gsfc.nasa.gov
>pete.allen@msfc.nasa.gov
>jlabrecq@hq.nasa.gov
>cherbert@hq.nasa.gov
>astowes@hq.nasa.gov
>Ernest.M.Graham@msfc.nasa.gov
>dan.thomas@hq.nasa.gov
>g.m.watson@larc.nasa.gov
>rdilustr@mail.hq.nasa.gov
>hstewart@hq.nasa.gov
>speyton@hq.nasa.gov
>jlemke@hq.nasa.gov
>whill@hq.nasa.gov
>michael.stevens-2@ksc.nasa.gov
>jlloyd@hq.nasa.gov
>prichard@hq.nasa.gov
>
>
>Regards, Jon
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>
>
>
>Jonathan B. Mullin
>Manager Operational Safety
>Emergency Preparedness Coordinator
>Headquarters National Aeronautics and Space Administration
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X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-q using -f
X-Sender: prutledg@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 12:20:54 -0500
To: jlloyd@hq.nasa.gov
From: Pete Rutledge <prutledg@hq.nasa.gov>
Subject: Fwd: Questions/issues for Bryan's use
Cc: code-q@lists.hq.nasa.gov
Sender: owner-code-q@lists.hq.nasa.gov

Jim,

Attached is first batch of questions/issues for Bryan's use on the Columbia Accident Investigation Board. These are a combination of inputs from SMA Directors and from OSMA staff members; Pam Richardson is pulling them together and maintaining the list. We would propose that you send to Bryan daily--only the new questions/issues (to minimize e-mail download time on Bryan's end). They are numbered sequentially and in chronological order, so it will be easy to send just the new ones. By means of this e-mail, I'm sending the list of questions/issues to all OSMA staff members. As Ron Moyer suggested, seeing these questions/issues may prompt thoughts of new ones.

Suggest sending this batch to Bryan ASAP.

Thanks,

Pete
X-Sender: prichard@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 11:19:40 -0500
To: Pete.Rutledge@hq.nasa.gov
From: Pamela Richardson <prichard@hq.nasa.gov>
Subject:

~~~~~~

Pamela F. Richardson
Aerospace Technology Mission Assurance Manager
Enterprise Safety and Mission Assurance Division, Code QE
Office of Safety and Mission Assurance, NASA Headquarters
300 E. Street, S. W., Washington, DC 20546
phone: 202-358-4631, fax: 202-358-2778

~~~~~~

"The meek can *have* the Earth. The rest of us are going to the stars." --- Robert Heinlein
"We have to learn to manage information and its flow. If we don't, it

will all end up in turbulence." --- RADM Grace Hopper


questionsforbryan.doc

Peter J. Rutledge, Ph.D.
Director, Enterprise Safety and Mission Assurance Division
Acting Director, Review and Assessment Division
Office of Safety and Mission Assurance
NASA Headquarters, Code QE, Washington, DC 20546

ph: 202-358-0579
FAX:202-358-2778
e-mail: pete.rutledge@hq.nasa.gov

Mission Success Starts with Safety!

From: "W Frazier" <wr.frazier@verizon.net>
To: <jlemke@hq.nasa.gov>, <prutledge@hq.nasa.gov>
Cc: <jmullin@hq.nasa.gov>, "Wayne Frazier" <wfrazier@hq.nasa.gov>
Subject: my yellows
Date: Sat, 8 Feb 2003 13:59:50 -0500
X-Mailer: Microsoft Outlook Express 6.00.2720.3000
X-Authentication-Info: Submitted using SMTP AUTH at out003.verizon.net from [4.42.97.8] at Sat 8 Feb 2003 13:00:00 -0600

I don't see range safety anymore. Was it deleted. I can add some words, although it won't be a concern for 107


030208 9am - Topic Areas for Safety and Mission Success.doc

Topical Areas for Safety and Mission Success/Assurance Questions and Answers

Throughout this collection of questions and answers, the term "Safety" is used to mean, and in place of, the term "Safety and Mission Assurance (SMA)"

Table of Contents of Question Areas

POLICIES, PROCEDURES, GUIDELINES, AND STANDARDS

Policy Development

• Who approves NASA safety policies?	• Safety policies are approved at appropriate level of management. NASA Policy Directives explain the policy and why it exists and are approved by the Administrator. NASA Procedure and Guideline Documents explain how to apply the policies and are approved by the Associate Administrator for Safety and Mission Assurance.
• What are NASA safety requirements based on?	• Safety requirements conform with and complement federal, state and local laws and regulations; applicable executive branch direction; and NASA policy. • Customer needs and requirements as well as lessons learned (from past experience – good and bad) and preferred practices are incorporated into safety policy documentation.
• How are NASA policy documents made available to employees and contractors?	• Safety policies and procedures are available to all personnel via an Agency-wide electronic library (NODIS: NASA On-line Document Information System).
• How does NASA policy apply to contractors?	• NASA makes policy applicable to contractors through their [redacted].
• Who approves exceptions, waivers and exemptions from safety Policies?	• Exceptions, waivers and exemptions to established policies are approved at the same level as the policy (unless policy allows for lower level approval) and they are documented.
• **** • How would you describe a robust safety program?	• A robust safety program has the following qualities: ✓ Management commitment and employee involvement ✓ System and worksite hazard analysis ✓ Hazard prevention and control ✓ Safety and health training ✓ [redacted]

Requirements Implementation

• How is NASA assuring that your policies are properly executed by NASA Centers & Contractors?	• NASA Headquarters Safety and Mission Assurance periodically surveys the NASA Centers to verify the adequacy of safety processes. • The Centers in-turn survey the contractors for compliance. • In addition, the NASA Inspector General plays an integral part in the "checks and balances" process. • The NASA Aerospace Safety Advisory Panel (ASAP) independently monitors the strength of the safety of human spaceflight activity. • [redacted]
• What did NASA [redacted] do to monitor the safety of the human space flight program when program management was moved from NASA Headquarters to JSC and Shuttle ground processing was transitioned to the United Space Alliance?	[redacted] Consistent with federal acquisition policy, NASA moved to a best commercial practices relationship with the private sector. [redacted] • NASA transformed our approach to one of oversight to one of insight. This reduced the government's direct interaction with contractors, while retaining visibility into their performance and better allowing the private sector to do what it does best. • In 1996, as an additional safety measure, the Associate Administrator for Safety and Mission Assurance formed the Human Exploration and Development of Space (HEDS) Assurance Board (HAB) comprised of the Safety and Mission Assurance Directors from the human space flight centers, a payload safety representative, an astronaut crew safety representative, and a Space Shuttle Program representative. From the outset the HAB was to be in existence only during the period of Shuttle Program transition. The HAB met monthly from 1996 until mid-2002 to communicate, coordinate, and solve human space flight safety concerns. During that period, the HAB periodically met with and advised the NASA Administrator on safety matters.
• Why was the Human Exploration and Development of Space (HEDS) Assurance Board (HAB) deactivated last year?	• In mid-2002, feeling that the transition had reached a steady-state condition, regular HAB meetings were discontinued and it reverted to an on-call status. In late January 2003, we were planning to call a HAB meeting in the next couple of months to discuss the need for continued safety vigilance in light of push to meet the February 19, 2004, goal for core completion of the International Space Station.

MANAGEMENT LEADERSHIP & EMPLOYEE INVOLVEMENT

Management Leadership, Commitment, And Involvement

• What is the role of senior management in NASA's safety program?	• Senior management conspicuously promotes safety. They also provide advocacy, leadership, policy direction, functional management, integration, and coordination for mission success. [redacted]
• What is the role of the Associate Administrator for Safety and Mission Assurance?	• The Associate Administrator for Safety and Mission Assurance is NASA's chief advocate for safety, and serves as an independent advisor to the Administrator and the Enterprises. • The Associate Administrator for Safety and Mission Assurance serves as the functional manager for safety, mission success, and the associated disciplines. [redacted]
• What is the role of line management in NASA's safety program?	• Line management communicates fundamental safety and mission success requirements to employees, manages the continuous implementation, and assures that they are understood. • Supervisors are personally responsible for the safety and health of their workers
• How is NASA assuring excellence in safety activities [redacted]	• Management is taking steps to achieve/maintain world-class and have it third party certified by the Department of Labor as a under OSHA's Voluntary Protection Program and registration to ISO 9001 or AS 9100.

Responsibility, Accountability, Authority, Resources (People, Money), And Organization

• What authority does Safety have in the launch decision process?	•

What is the organizational structure of NASA Safety?	• The Associate Administrator for Safety and Mission Assurance reports directly to the NASA Administrator. • The Safety and Mission Assurance Directors at the Centers report to the Center Director (except LaRC) which is outside of the program reporting chain. This direct access to the Center Director provides the authority needed to manage Safety efforts. • The safety organization is independent of the program offices (e.g.; NSTS, ISS) so it is well positioned to provide objective nonadvocate reviews and assessments of safety processes and implementations of requirements. • Center Safety and Mission Assurance Directors have an independent reporting path to the Associate Administrator for Safety and Mission Assurance, so that they can be assured safety concerns are addressed.
• Who is accountable for safety?	• Managers are accountable for the safety of their programs. • Supervisors are accountable for the safety of their workers. • Workers are accountable for performing their jobs in a safe manner and adhering to all prescribed safety rules and procedures.
• Where is safety accountability documented?	• This is clearly established in NASA Policy Directive 1000.3, "The NASA Organization" for Officials-in-charge of Headquarters and Centers. Also, Enterprise Associate Administrator 's are responsible for fully implementing safety into their area of control. • Safety responsibilities are further emphasized in NASA Policy Directive 8700.1, "NASA Policy for Safety and Mission Success," to hold managers accountable for safety within their areas.
• How does NASA allocate adequate resources to safely accomplish the missions?	• Responsibility for compliance with the safety policies is placed on each organizational element to include the allocation and maintenance of appropriate levels of authority, budgeted resources, and training necessary for its fulfillment. Budgeted resources are defined to include people, equipment, safety tools, and facilities.
• How does the safety community identify and communicate its resource needs?	• Each Center documents safety resource needs in Center Annual Operating Agreements which are reviewed by the Center Director, Enterprise Associate Administrator and the Associate Administrator for Safety and Mission Assurance. As a part of this process, Centers are asked annually to identify to Headquarters any resource shortfalls.

• How did the budget tightening and downsizing of NASA in the 90's affect the way NASA assures Safety and Mission Success? Specifically, can NASA safely accomplish its missions with the resources it is allocated?	• As an agency, NASA was challenged to find ways to assure safety and mission success with tighter limits on resources. NASA responded in a number of ways. [redacted] By evolving the safety processes where certain individuals felt responsible for Safety and Mission Success, to an environment where everyone involved knows they have that responsibility. [redacted] • By employing methodologies like PRA to better identify the most significant risks , thereby helping to get the most efficient risk reduction for the dollars invested.
• Has NASA's downsizing impacted the Agency's ability to conduct its programs and operations safely? [redacted]	• Throughout the downsizing activity, NASA has upheld its responsibility to assure that safety would not be compromised. Safety staffing and resources surveys are periodically conducted to maintain an up-to-date picture of Agency wide safety resources. Safety and Mission Assurance Directors from across the Agency meet quarterly to discuss concerns, share best practices, and report status of safety efforts. These meetings provide an open forum for Center Directors to raise any issues they have regarding safety, including resources concerns. To date, no Safety and Mission Assurance Director has indicated that the safety function was so understaffed that it would not be able to perform the job. • ** A current staffing study is underway.
• How does NASA assure that safety resources are adequate?	Enterprise Associate Administrators and Center Directors review safety resources and level of safety involvement in programs. (Annual Operating Agreements are used to advocate for additional funding.) • Headquarters Office of Safety and Mission Assurance reviews Center safety resources during Process Verification reviews at Centers.
• What effect has contracting out had on safety?	• Our metrics [redacted] have not shown any negative effects.
• Does NASA follow OSHA regulations?	• 29 CFR 1960 regulations/laws are fully implemented, managed, monitored, and in compliance. • Several NASA Centers are 'Star Certified' to OSHA's Voluntary Protection Program (VPP).
• How does NASA assure that special safety functions are appropriately managed?	• NASA specifically designates appropriate individuals or groups to advocate and manage special safety functions. Examples include: Designated Agency Safety and Health Official, Aviation Safety Officer, and Range Safety Officer.

• Did all of NASA's responses to Columbia follow established NASA Contingency Plans? •	• NASA program managers are tasked to develop contingency plans. The [redacted] was implemented "by the numbers" and incorporated Emergency Preparedness Response activities as the Rapid Response deployed. A strong NASA Emergency Infrastructure provided for an effective Rapid Response Force. Plans were in place and defined specific responsibilities. Local, state, and federal responders supported NASA in this National Emergency in a stellar manner.

Program Planning, Schedule, Planned Upgrades

• How are safety efforts documented by NASA's programs and projects?	• NASA programs and projects develop and maintain Safety and Mission Assurance program plans which: ✓ Reflect established policies and regulations and are successful results-oriented and measurable. Measurements are contained in the plans. ✓ Are prepared for all facilities/workshops and the programs/projects at the facility. ✓ Address development, testing, operations, and contingency/emergency operations. ✓ Address all the applicable elements in ISO 9001. ✓ Recognize and document customer needs. ✓ Safety and Mission Assurance plans are available to all personnel. ✓ Are periodically reviewed and updated as they mature.

Contractual Instruments, Flow-Down, Insight, Oversight

• How does NASA assure safety and quality on procured products and services?	• Performance requirements including safety are established and verified for all purchased products and services. Where acceptable, commercial standards are used. • Appropriate safety provisions are included in all contracts (to include applicable NASA Policy Directive/NASA Procedure and Guidelines/NASA-Stds/… and ISO 9001) based on risk and promote mission success. • Safety protection provided for all contract employees is equal to that provided for NASA employees while working on NASA contracts and contingency/emergency provisions are included. • Safety requirements in service and engineering contracts are reviewed by the safety organization prior to implementation if they involve risk to NASA or it's workers. • Quality requirements are specified for acceptance of all products.
• Did the reduction in the government quality inspections contribute to decreased safety?	• Over the last 10 years there has been a gradual decrease in the hours allocated to government inspectors (civil servant and DCMA). This decrease is a result of and proportional to the following: ✓ Advancement in technologies (automated processes for measuring, analyzing, improving and controlling quality) ✓ Increased accountability imposed on contractors (increase in contractor quality accountability) ✓ Maturity of NASA's major programs
• What has quality been doing to address the decreased availability of government inspectors?	• For the Shuttle Program, the objective measures of quality which can be monitored at a program level have indicated a steady improvement of program quality: ✓ Significant reduction in frequency of launch delays, scubs, and pad-aborts. ✓ Overall decrease in the rate of In-Flight Anomalies (IFAs) per flight ✓ Decrease in number Shuttle element Unsatisfactory Condition Reports (UCRs) ✓ Higher percentage process flow milestone dates being met.

• Did the change from government standards to industry based standards cause a decrease in safety margins?	• For high criticality activities, such as the Shuttle Program, NASA has always maintained a significant degree of safety and quality expectations that include specific requirements for inspection, document retention, failure notification, control of design changes, and the disposition of hardware non-conformities. Adoption of industry-based standards have allowed NASA to take advantage of industry capabilities and "third party" assessment activities; however, NASA continues to maintain tight control over contract quality expectations. NASA has recently adopted a new aerospace standard for quality systems (AS 9100), which will further increase the quality expectations of the NASA supply base.
• Did the switch from government oversight (direct inspection) to government insight (indirect monitoring) reduce the margin of safety?	• During the mid-90s there was a NASA wide activity to re-baseline the use of mandatory inspection points. Established criteria was used to ensure that critical inspections would continue, and that reductions would be limited to non-critical activity or activity where duplicative inspections had been created over a period of time. This rebaseline effort allowed the government to better focus it's inspection activity and also enabled quality resources to be applied to monitoring of other quality indicators such quality system performance and the capability of critical processes. To this date there continues to be a significant number of government inspections performed on NASA Programs (including Shuttle). Furthermore, because of the use of process and system monitoring there is more quality performance data (wider range of data, more readily available) then previously available for review.

Motivational, Promotional, Awareness Activities

• Does NASA have a documented, consistent system for evaluating performance, including rewarding exceptional performance and correcting unacceptable performance?	• NASA Procedure and Guidelines 3430.1A, NASA Employee Performance Communication System (EPCS), provides the specific procedures, methods, and requirements for planning, monitoring, and assessing employee performance in accordance with the NASA EPCS and applicable law and regulations. The EPCS places strong emphasis on the direct, one-on-one interaction between a supervisor and an employee. • A consistent awards system is applied to all employees (including supervisors and managers). • A consistent disciplinary system is applied to all employees (including supervisors and managers) who disregard the rules. • Safety personnel are regularly recognized for outstanding contributions and are recommended for local and Agency-level awards to include SFA, QASAR, …

• Does NASA reward employees and contractors for efforts taken to keep NASA people and property safe?	• Each year, NASA provides monetary exceptional performance awards to safety personnel who have demonstrated excellent performance in their jobs. In addition, there are several very high visibility award programs that recognized exceptional performance. They include the following: ✓ The Quality and Safety Achievement Recognition (QASAR) award recognizes NASA, other Government, and prime/subcontractor individuals for significant quality improvements to products or services for NASA, as well as safety initiatives within products, programs, processes, and management activities. ✓ The Space Flight Awareness Award Recognizes significant achievements leading to safe, cost-effective program modifications that increase reliability, efficiency, and performance to ensure mission success and human safety. This Award is applicable to employees from all NASA Centers, supporting Government agencies, private industry, and international organizations supporting human space flight programs. ✓ The NASA Flight Safety Award Recognizes significant contributions to flight safety for those space programs involving human flight. This Award is applicable to employees from all NASA Centers, supporting Government agencies, private industry, and international organizations supporting human space flight programs. ✓ NASA's George M. Low Award, designed primarily to recognizes NASA`s prime and subcontractors for outstanding performance in the categories of large and small business, product, and service organizations, considers safety as a "Item of Special Interest to NASA" in the award criteria.

Internal Studies And External Reviews

• Does NASA pay attention to audits and reviews by external organization? What does NASA do with audit reports.	• Reviews are conducted in a manner which meets the needs of the external organization and in the best interest of NASA. • NASA Policy Directive 1200.1A, Internal Management Controls and Audit Liaison and follow-up, provides specific instructions for responding to external reviews and audits. NASA personnel are required to cooperate with the GAO and OIG representatives in the audit, inspection, and assessment processes in any activity in which those representatives are engaged. All NASA offices are expected to adhere to this policy in a reasonable and timely manner. NASA personnel are required to work with auditors and other OIG and GAO representatives to provide an accurate, fair, and balanced representation on all issues being evaluated, consistent with the Inspector General Act. NASA responds to each recommendation and has a process in place to follow up and make sure corrective actions are completed. In addition, the Agency provides a formal response to all findings in the annual report of the Aerospace Safety Advisory Panel (ASAP). The ASAP is a senior advisory committee that reports to the National Aeronautics and Space Administration (NASA) and Congress. The Panel was established by Congress after the Apollo 204 Command and Service Module spacecraft fire in January 1967.

HAZARD AND RISK [redacted]

Risk Management

Risk Identification And Mitigation

• How does NASA manage risk?	• Program and project risks are fully identified throughout the development and operational life cycle and are periodically reviewed by the appropriate program management councils. [redacted]
• Does NASA require a formal risk management process on all programs and projects?	• Yes, in NASA Procedures and Guidelines document 7120.5, "Program and Project Management."
• How does NASA verify compliance with safety requirements?	• Processes are in place to ensure conformity of products and services with specified requirements.
• What is the basic tenant of risk management?	• Success oriented.

• Are all risks treated equally?	• Mitigation processes and results are commensurate with the identified safety risk.
• How do employees know who to turn to for help in conducting the risk management processes?	• Safety Management has provisions in place for Center personnel to have direct access to safety & Health professional staffs.
• How are identified risks delt with?	• Abatement plans are in place and decisions on program management are risk based.
• How do you control risks in NASA contracts?	• We have developed specific safety and health clauses that are required on all NASA contractors to explicitly protect and keep safe the public, astronauts, pilots, and the NASA workforce in the conduct of all our missions. These clauses are contained in our comprehensive NASA Federal Acquisition Regulation (FAR) supplement. For example, we have requirements to develop quality assurance surveillance plans, check high-risk areas and tie the results to our performance-based contracting incentives.
• Was RBAM ever totally integrated into all of the Agency's contracts? Why shoot ourself in the foot here [redacted]	• This area has been aggressively pursued during Code Q Process Verification [redacted]
• Risk Based Mission Assurance has been a contract requirement of the NASA FARs since 2000. Have all contracts been reviewed and updated as requested by the NASA Administrator Dan Goldin in November 2000? [redacted]	• Contracts are being updated as needed for additional specific NASA FAR safety, health, and reliability requirements.
• Since ~80% of NASA's budget goes to contractors, how does NASA control risks that may result from work done by the lowest bidder?	• At each acquisition milestone (e.g. requirements development, requests for proposals, source selection), NASA has established requirements and processes to identify, track, analyze, fix and communicate specific technical, cost, schedule, safety, security and environmental risks.

Risk Tracking

• How is NASA controlling risk on Shuttle and other NASA missions? At what point are risks determined to be too high to continue?	• For each mission and at every major mission review, risks are continuously evaluated and communicated. We have instituted a comprehensive agency Continuous Risk Management training program and have a formal structure for risk management including risk acceptance in our management process and policy directives for program and project management. Recently, we have also refined standards for risk definition and categorization agency-wide. • On major NASA projects, you will find specific risk management plans and management tracking of as part of regular reporting within the projects and to upper management during regularly schedule Program Management Councils (PMCs) and Launch Readiness/Approval Reviews.

Lessons Learned

• Are NASA programs and projects providing complete investigative reports, corrective actions and lessons learned to support a world class mishap prevention program?	• Capturing of Lessons Learned process is defined in official documentation is implemented, and lessons are recorded and communicated to programs/facilities. • NASA Lessons Learned Information System (LLIS) is being used for entry and retrieval of data. • NASA's Incident Reporting Information System (IRIS) has a comprehensive system to report, record and follow up mishaps and close calls.
• What is LLIS (Lessons Learned Information System)?	• An on-line, automated information system designed to collect and make available for use the NASA lessons learned from over forty years in the aeronautics and space business. The LLIS enables the knowledge gained from past experience to be applied to current and future projects. Its intent is to avoid the repetition of past failures and mishaps, as well as the ability to share observations and best practices. Through this resource, NASA seeks to facilitate the early incorporation of safety, reliability, maintainability, and quality into the design of flight and ground support hardware, software, facilities, and procedures.
• Who can access, search, or contribute to the LLIS?	• Any NASA civil servant, on-site contractor, or off-site contractor (off-site contractors require user IDs and passwords.)

• What is the LLIS Management Structure?	• Oversight of the LLIS is provided by the Office of Safety and Mission Assurance (Code Q) at NASA Headquarters. The system and its content are managed by the NASA Lessons Learned Steering Committee (LLSC). This committee is composed of members from all NASA centers. The LLIS Curator, who serves under the direction of the LLSC Chairperson, has operational responsibilities for the system.
• How are new lessons approved and incorporated into the system?	• Lessons learned contributors first complete the submission of a lesson online. In turn, the system stores and tracks the submitted lesson through an internal multi-step approval process. Once a lesson is approved, the LLIS Curator adds it to the operational database. The LLIS also supplies the tools to support the internal review and approval process for submitted lessons.
• Was any LLIS data received that pertained specifically to STS-107?	• TDB.

Personnel Reliability Program (PRP)

• Does NASA have a program to assure that people who have access to the shuttle are screened for background and [redacted]	• NASA has a policy in place to assure that all personnel (government and contractor) who have access to the shuttle or other critical space systems are screened from a security, medical, and suitability basis.

Software Assurance

Software Risk Management/Tools/Plans

• What risk management techniques have been applied to Software development, operations, maintenance, cost, safety and assurance?	• NASA has an aggressive risk management approach. All projects are required to have and follow a risk management plan. Software is part of this process.
• Where is the proof that this is performed?. What are Shuttle's risk management plan(s), records, mitigation strategies?	• TBD by Shuttle program.
• What risks has the Shuttle program identified in the area of software flight controls? – What was done about them?	• TBD by Shuttle program.

Software Flight Readiness/Certification

• Is software directly reviewed at the PAR and FRRs?	• Yes.
• Were software changes made for	

STS-107?	
• What tests are performed? Who signs-off? NASA or USA or both?	• TBD by Shuttle program (SMA Sharyl Butler)

Software Requirements

• What are the assurance and safety requirements for NASA software critical systems?	• NASA has a software Safety standard and Guidebook. Software safety and Independent Verification and Validation are required for software safety critical systems. • Independent Verification and Validation requirements and capabilities are defined, documented and controlled. • Independent Verification and Validation is conducted to a level appropriate to the risk and mission success criticality. • Independent Verification and Validation process is controlled and monitored by appropriate level of management. • Software avionics integration laboratory does system level testing of software changing before each flight.

Software Best Practices

• How do you know that the best industry and or DOD practices are being used in the development of NASA's Software?	• We have both the NASA Policy Directive 2820.1 NASA Software Policy, and the • NASA Software Engineering Improvement Initiative which require and provide implementation toward use of best practices. This now includes directions to assess the contractors and to levy specific best practices on the contractor as well as on NASA internal software development.

Emergency/Contingency Preparedness

Emergency Preparedness

•	• Emergency Protection Program is established, thorough and operational and is reviewed frequently.
• Has the Homeland Security organization been implemented seamlessly throughout NASA? [redacted]	• The Homeland Security function is only beginning to be implemented into NASA emergency preparedness, fire protection and security. These functions have been institutionalized within NASA for several years under supervision of each NASA Center Director. [redacted]
• As the senior NASA official, do you actively participate in NASA program contingencies, exercise and program	• [redacted] !!!!!

anomalies?

- Does NAS