X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-q using -f
X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 11:09:20 -0500
To: code-q@lists.hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Fwd: Senate Resolution 41   February 3, 2003 (Correction)
Sender: owner-code-q@lists.hq.nasa.gov

Slight nuance in the wording of the resolution that Paul brought to my attention.

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-q using -f
X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 09:37:49 -0500
To: code-q@lists.hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Senate Resolution 41   February 3, 2003
Sender: owner-code-q@lists.hq.nasa.gov

For your information; the Senate, when it adjourns today, will do so in honor of the seven astronauts.

Jim

Senate Resolution 41 commemorate1.doc

Jim

To: James Lloyd <jlloyd@hq.nasa.gov>, "Wayne R. Frazier" <wfrazier@hq.nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Old shuttle risk study by Pate-Cornell
Cc: prutledg@hq.nasa.gov, jlemke@hq.nasa.gov, jlyver@hq.nasa.gov
Bcc:
Attached:

Jim:
I already gave Wayne copies of two papers published by Elizabeth based on that work. I am also
getting a copy of the report today and I will forward a copy to you and Wayne.
Michael

At 10:26 AM 2/4/2003 -0500, James Lloyd wrote:
I recall seeing the study and recall it being on workmanship and its relationship to goodness of
tile application. The study also treats the risk in a probabilistic sense. Maybe Bill Loewy could
do a search on the web if it might be available externally or on the servers if internally. I think
it predates Bob Weinstock but I may be wrong unless it was worked through Vitro. I would
bet it is somewhere where we might have all the supporting documents for risk assessment.

At 09:58 AM 2/4/2003 -0500, Wayne R. Frazier wrote:
Jack Mannix from legal just called me. They are looking for a 1990 study by Elizabeth Pate-
Cornell at Stanford on Shuttle Risk Analysis. I think I remember Bob Weinstock working
that from here out of Code Q funds. Does anyone have a copy. Apparently its getting some
press.

Wayne
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
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"

Jim

To: "Wayne R. Frazier" <wfrazier@hq.nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Old shuttle risk study by Pate-Cornell
Cc: jlloyd@hq.nasa.gov, prutledg@hq.nasa.gov, jlemke@hq.nasa.gov, jlyver@hq.nasa.gov
Bcc:
Attached:

We talked about this and I gave you copies of two papers Cornell wrote based on it. I should also get later today a copy of the report and I will make you a copy.

At 09:58 AM 2/4/2003 -0500, Wayne R. Frazier wrote:
Jack Mannix from legal just called me. They are looking for a 1990 study by Elizabeth Pate-Cornell at Stanford on Shuttle Risk Analysis. I think I remember Bob Weinstock working that from here out of Code Q funds. Does anyone have a copy. Apparently its getting some press.

Wayne
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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-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 12:37:20 -0500
To: hcat@hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Fwd: Re: Old shuttle risk study by Pate-Cornell (re: tiles on
  Orbiter)
Cc: prichard@hq.nasa.gov, prutledg@hq.nasa.gov,
     mark Kowaleski <mkowales@mail.hq.nasa.gov>,
     mgstamatelatos <mstamate@mail.hq.nasa.gov>,
     stacey.t.nakamura1@jsc.nasa.gov

An item for your consideration. We will have this information available today if you need it also.

X-Sender: mstamate@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 11:11:16 -0500
To: James Lloyd <jlloyd@hq.nasa.gov>,
     "Wayne R. Frazier" <wfrazier@hq.nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Old shuttle risk study by Pate-Cornell
Cc: prutledg@hq.nasa.gov, jlemke@hq.nasa.gov, jlyver@hq.nasa.gov

Jim:
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Michael

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that from here out of Code Q funds. Does anyone have a copy. Apparently its getting some
press.

Wayne

~~~~~~

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"

Jim

****

Dr. Michael Stamatelatos
Manager, Agency Risk Assessment Program
NASA Headquarters - Mail Code QE
Office of Safety and Mission Assurance
300 E Street, SW
Washington, DC 20024
Phone: 202/358-1668 Fax: 202/358-2778
E-mail: Michael.G.Stamatelatos@nasa.gov
(Please note change in e-mail address)
****

"Mission success starts with safety"

Jim

X-Sender: wfrazier@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Tue, 04 Feb 2003 14:26:55 -0500
To: prichard@hq.nasa.gov
From: "Wayne R. Frazier" <wfrazier@hq.nasa.gov>
Subject: Fwd: Re: Old shuttle risk study by Pate-Cornell
Cc: mstamate@hq.nasa.gov, prutledg@hq.nasa.gov, jlemke@hq.nasa.gov,
    jlloyd@hq.nasa.gov, sbrookov@hq.nasa.gov

I have received a clean copy of the report plus three magazine articles from Michael S. and will
take up to Legal per Pete's direction.
W

Pamela please add this to your log of actions done. Sylvia, please close this out on the QS log.
 X-Sender: prutledg@mail.hq.nasa.gov
 X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
 Date: Tue, 04 Feb 2003 10:37:24 -0500
 To: James Lloyd <jlloyd@hq.nasa.gov>,
     "Wayne R. Frazier" <wfrazier@hq.nasa.gov>, mstamate@hq.nasa.gov
 From: Pete Rutledge <prutledg@hq.nasa.gov>
 Subject: Re: Old shuttle risk study by Pate-Cornell
 Cc: jlemke@hq.nasa.gov, jlyver@hq.nasa.gov

Jim,

We had already anticiapted the need for the report. Couldn't find it here. I asked Michael S.
to call her. Should arrive today via FedEx. I hope our call didn't cause her to give a press
conference!!

Pete

At 10:26 AM 2/4/2003 -0500, James Lloyd wrote:
 I recall seeing the study and recall it being on workmanship and its relationship to goodness of
 tile application. The study also treats the risk in a probabilistic sense. Maybe Bill Loewy could
 do a search on the web if it might be available externally or on the servers if internally. I
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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"

Jim

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!

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
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"

From: "RAILSBACK, JAN (JSC-NX) (NASA)" <jan.railsback-1@nasa.gov>
To: "   ,

    "BOYER, ROGER L. (JSC-NC) (SAIC)" <roger.l.boyer1@jsc.nasa.gov>,

    "HEYDORN, RICHARD P. (JSC-NX) (NASA)" <richard.p.heydorn@nasa.gov>,
    "LEE, ALICE T. (JSC-NX) (NASA)" <alice.t.lee@nasa.gov>,
    "LONDRIGAN, DENISE L. (JSC-NC) (SAIC)" <denise.l.londrigan1@jsc.nasa.gov>,
    "Mike Stamatelatos (E-mail)" <mstamate@mail.hq.nasa.gov>,
    "PERERA, JEEVAN S., PHD (JSC-OE) (NASA)" <jeevan.s.perera@nasa.gov>,
    "ROELANT, HENK (JSC-NC) (NASA)" <henk.roelant-1@nasa.gov>,
    "STEWART, MICHAEL A. (JSC-NC) (SAIC)" <michael.a.stewart1@jsc.nasa.gov>
Subject: FW: NPR radio interview
Date: Tue, 4 Feb 2003 16:27:13 -0600
X-Mailer: Internet Mail Service (5.5.2653.19)

FYI,

You can hear Joe on NPR radio by going to the audio archives

Jan W. Railsback
Lead Analyst
Safety, Reliability, and Quality Assurance
Advanced Programs and Analysis Division
Ph: 281-483-7265
Fax: 281-244-2318
jan.railsback-1@nasa.gov

-----Original Message-----
From: ·
Sent: Tuesday, February 04, 2003 8:29 AM
To: RAILSBACK, JAN (JSC-NX) (NASA);
             '; FRAGOLA, JOE R.; Johnson, Ray O.; Buchanan,
Robert B.; Zollars, Ronald M.; McIntosh, Jason A.; Blake Putney; Darrell
N. Walton; Minarick, Joseph; Erin Collins; Hutchinson, Neil B.; Moore,
Lynn M.; Haddad, Benjamin A.
Subject: RE: NPR radio interview

I suggest we put a news note about Joe's interview on ISSAIC/iNEWS.
NPR has program audio clips on their web site at http://www.npr.org.

Regards,

At 8:31 AM -0500 2/4/03,   wrote:
>To all,
>Enclosed is the transcript of the NPR program, "All Things Considered"
>with Joe Fragola being interviewed by Chris Joyce -- overall, a positive
>piece.
>
>Please call/email me if you have any questions or concerns.
>

>

>SAIC
>Director of Public Affairs, Washington Operations

>
>
>
>-----Original Message-----
>From:
>Sent: Monday, February 03, 2003 3:29 PM
>To: ' ¯   Johnson, Ray O.; Buchanan,
>Robert B.; Mapar, Jalal; Zollars, Ronald M.; McIntosh, Jason A.; Blake
>Putney; Darrell N. Walton; Minarick, Joseph; Erin Collins; RAILSBACK,
>JAN (JSC-NX) (NASA)
>Subject: RE: NPR radio interview
>
>
>I have a service tracking the info - will get back to you all with
>transcript soon.

>

>SAIC

>

>

>-----Original Message-----

>From:

>Sent: Monday, February 03, 2003 4:29 PM

>To: Hashim, Zuraidah;   __.,.__ ...; Johnson, Ray O.; Buchanan, Robert

>B.; Mapar, Jalal; Zollars, Ronald M.; McIntosh, Jason A.; Blake Putney;

>Darrell N. Walton; Minarick, Joseph; Erin Collins; Railsback, Jan

>Subject: Re: NPR radio interview

>

>

>To all:

>

>I just heard that the Chris Joyce piece aired on NPR and my name was

>mentioned.

>I missed it.

>

>

>

>>

>> I spent some time on the phone with this gentleman. I told him that I

>could

>> not speculate on what actually happened, but that I was prepared to

>discuss our

>> study and that he could obtain a copy of it, if he wished, since it

>was

>> published.

>>

>> He asked me to explain the study and I told him that it was a scenario

>based

>> Probabilistic Risk Assessment of the Launch to Landing risk of the

>Space

>> Shuttle. That it included both ascent and descent scenarios. I told

>him

>that

>> literally thousands of accident sequences were investigated. I told

>him

>that

>> of those that three scenarios that were dominant on descent were

>related

>to the
>> TPS, (i.e. the thermal tiles), the APUs (i.e. the Auxiliary Power
>Units)
>and
>> the Landing itself.
>>
>> He asked about the tiles and I told him that in our study we
>referenced
>the
>> work of Drs. Pate-Cornell of Stanford and Fischbeck of
>Carnegie-Mellon.
>I
>> told him although I was thoroughly familiar with the work, as I had to
>be
>to
>> include it, I did not perform it. He asked for a general explanation
>of
>the
>> work and I told him that it investigated several important items,
>including the
>> heat load on the tiles (i.e. which of the tiles were critical), the
>functions
>> supported underneath the tiles, the damage that had occurred to the
>tiles
>> including location, and the mechanisms that would cause loss of a tile
>besides
>> a debris hit (such as debonding). He asked about the so called
>"zipper
>> effect", that is the loss of one tile causing the subsequent loss of
>others,
>> and I indicated that this was addressed in the study.
>>
>> He then asked about the APU and I told him that it supplied hydraulic
>power to
>> the control surfaces on descent. I told him that they were redundant,
>but
>that
>> we looked at the common cause failure effects because of the corrosive
>and
>> explosive nature of hydrazine. I told him that the most probable
>cause
>> assessed in the study for APU failure contributing to risk was loss of
>control

>> and that this had actually happened, although after touchdown on an
>early
>> shuttle flight.
>>
>> He asked if from what I had heard could this have contributed to the
>loss
>of
>> Columbia. I told him that any answer to that would be speculation on
>my
>part
>> and all I was prepared to do was to speak about the study. I did say
>that
>the
>> events and data received so far appeared to be consistent with either
>the
>TPS
>> scenario or the APU, but that I had no better data than what was given
>to
>the
>> media.
>>
>> I told him that these things are extremely complex and that is the
>reason
>we do
>> PRAs, to untangle the various scenarios possible and imbed the
>analytical
>data
>> into the systematically developed scenarios, and that is what NASA
>would
>> presumably be doing. I also cautioned him not to jump to conclusions
>because
>> oftentimes what might appear to be the "obvious" cause turns out not
>to be
>the
>> most probable cause when all the data are integrated into all the
>scenarios.
>>
>> He said that he recalled from the Challenger that the O-rings were way
>down the
>> list initially. I responded that that is why we all need to be very
>cautious
>> and patient in our quest to find the cause.
>>

>> He asked for my full name and affiliation and I told him Joseph R.
>Fragola,
>> Vice President and Principal Scientist of SAIC, and that I worked for
>Dr.
>Jalal
>> Mapar. He asked if I was an engineer, and I said that my degrees were
>in
>> Physics, but that I was a PE.
>>
>> He then thanked me an hung up.
>>
>> The interview was taped, and presumably all or parts of it will be
>aired.
>He
>> promised to provide me with a transcript of what is aired if anything.
>>
>> That was about it.
>>
>> Joe
>>
>> "Hashim, Zuraidah" wrote:
>>
>> > Joe,
>> > Per our phone discussion, I will be providing Chris Joyce of NPR
>your
>phone
>> > number directly to conduct a taped interview with you regarding
>your/SAIC's
>> > participation in the risk assessment report we did for NASA in 1995.
>As
>I
>> > mentioned, since this is for radio, Joyce would like to maintain the
>> > integrity of the audio, and this makes it difficult for me to be on
>the
>line
>> > with you. I have also made it clear to Joyce that while you can
>certainly
>> > talk about your areas of expertise as it relates to the shuttle
>program,
>the
>> > report, etc., we would like to stay away from speculating what
>happened
>this

>> > weekend, and what this could mean to SAIC's work with NASA.
>> >
>> > Since I cannot be on the call with you, I would appreciate a phone
>> > call/email from you letting me know how the interview went, and what
>topics
>> > you discussed.
>> >
>> > Thanks for being very responsive --

>> >

>> > SAIC

>
>Attachment converted:
>(WDBN/MSWD) (0003F792)

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-q using -f
X-Sender: dmoore@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Wed, 05 Feb 2003 06:36:14 -0500
To: code-q@lists.hq.nasa.gov
From: Dale Moore <dmoore@hq.nasa.gov>
Subject: Fwd: Overtime related to loss of Columbia
Sender: owner-code-q@lists.hq.nasa.gov

X-Sender: jpieritz@mail.hq.nasa.gov

From: Joyce Pieritz <jpieritz@hq.nasa.gov>
Subject: Overtime related to loss of Columbia
Cc: AL Castillo <acastill@hq.nasa.gov>

We are aware that many of our employees are working overtime since the loss of Columbia. We are providing the following information on overtime, compensatory time and night pay as a guide. Feel free to share this information as needed with your Officials in Charge and others within your organization. My staff and I are available to provide additional assistance as needed during this difficult time.

General Information

Overtime is paid for work in excess of 8 hours in 1 day or 40 hours in a workweek except for employees working CWS (5-4/9) who are paid overtime for work in excess of their scheduled workday or work week.

For overtime pay purposes, rate of basic pay means the rate of pay fixed by law (including special rates) and any applicable locality pay.

The law bars members of the Senior Executive Service from earning either overtime or compensatory time (other than religious compensatory time).

Overtime Rates of Pay

For employees with rates of basic pay equal to or less than the rate of basic pay for GS-10, step 1, the overtime rate is the employee's hourly rate of basic pay multiplied by 1.5.

For employees with rates of basic pay greater than the basic pay for GS-10, step 1, the

overtime hourly rate is the hourly rate for GS-10, step 1, multiplied by 1.5. In the Washington, D.C, locality that rate is currently $31.34 per hour. This limitation does not apply to wage employees or to FLSA covered overtime pay.

Limitations on Overtime Pay

Normally overtime is limited on a bi-weekly basis, so that the sum of basic pay and premium pay for the pay period can not exceed the greater of the biweekly rate for (1) GS-15, step 10 (including any applicable locality rate or special salary rate), or (2) level V of the Executive Schedule.

In emergency situations, such as the loss of Columbia, the bi-weekly pay limitation may be waived by the Center Director. Tim Sullivan Acting Director, HQ Operations Office, has delegated the authority to waive the bi-weekly limit for headquarters employees to the Headquarters Officials in Charge.

Even if the bi-weekly limit is waived, however, there is still an annual pay limitation, which limits the total of basic pay and premium pay to the greater of the annual rate for (1) GS-15, step 10 (including any applicable special salary rate or locality rate of pay), or (2) Level V of the Executive Schedule. The annual rate for Level V of the Executive Schedule for this year is $125,400; since this is higher than the annual rate for GS-15, step 10, it is the annual limit for basic and premium pay for our employees.

Codes are responsible for providing the payroll office with the names of those employees who will be working overtime under the annual pay limitation; they must also notify payroll when that coverage ends, i.e., when the employees stop working overtime related to Columbia

Compensatory Time

Compensatory time is subject to the same restrictions as overtime. An employee may only work compensatory time to the extent that he/she would be eligible to be paid overtime for the hours worked.

These limitations do not apply to wage employees or to FLSA overtime pay.

Night Pay

Some offices have scheduled employees to work on shifts. Please be aware that there is a requirement to pay night pay for regularly scheduled work performed at night. Night pay is a 10 percent differential, paid for regularly scheduled work performed at night. This generally means work scheduled to take place between the hours 6 P.M.. and 6 A.M. This includes night work under a compressed work schedule.

Generally night pay is paid for work scheduled at or before the beginning of the administrative workweek. However, night pay is also paid for night work on a temporary assignment to a different daily tour of duty during the administrative workweek.

Night pay is paid in addition to overtime, Sunday, or holiday premium pay.

Joyce D. Pieritz
Deputy Director, HQ Human Resources Management Division
202-358-1149
jpieritz@hq.nasa.gov

To: Robert Navarro <Robert.J.Navarro@nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Report
Cc:
Bcc:
Attached:

Bob:
I'd like to ask you a favor.
In the mid-1980's, Robert K. Weatherwax president of the Sierra Energy and Risk Assessment, that is located in Roseville, CA, wrote a report on shuttle risk assessment. I remember reading this report when I was working on SP-100 (many moons ago). I do no have it any more. HQ is collecting all possible information on the shuttle and needs a copy.
Is there any way you can track it down and send me a copy by overnight delivery?
Thanks a lot,
Michael

To: Robert Navarro <Robert.J.Navarro@nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Report
Cc:
Bcc:
Attached:

I do believe it. If he asks why we want his report, tell him that we are collecting all shuttle-related information as input to the investigation.
Thanks, Michael

At 07:39 AM 2/5/2003 -0800, you wrote:
I have tracked down Robert Weatherwax but he doesn't want to talk until business hours. Can you believe it?

I have to call him back at 09:00.

Bob:
I'd like to ask you a favor.
In the mid-1980's, Robert K. Weatherwax president of the Sierra Energy and Risk Assessment, that is located in Roseville, CA, wrote a report on shuttle risk assessment. I remember reading this report when I was working on SP-100 (many moons ago). I do no have it any more. HQ is collecting all possible information on the shuttle and needs a copy.
Is there any way you can track it down and send me a copy by overnight delivery?
Thanks a lot,
Michael
****
      Dr. Michael Stamatelatos
      Manager, Agency Risk Assessment Program
      NASA Headquarters - Mail Code QE
      Office of Safety and Mission Assurance
      300 E Street, SW
      Washington, DC 20024
      Phone: 202/358-1668 Fax: 202/358-2778
      E-mail: Michael.G.Stamatelatos@nasa.gov
      (Please note change in e-mail address)
****
      "Mission success starts with safety"

--

****

Robert J. Navarro
Safety, Environmental and Mission Assurance
Deputy Director
NASA Ames Research Center
Code Q, Mail Stop 218-6
Voice: (650) 604-5640
Fax: (650) 604-6508

****

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-qe using -f
X-Sender: jlemke@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Thu, 06 Feb 2003 09:11:17 -0500
To: code-qe@lists.hq.nasa.gov, code-qs@lists.hq.nasa.gov
From: jlemke <jlemke@hq.nasa.gov>
Subject: Fwd: Assessing the Odds of Catastrophe.htm
Sender: owner-code-qe@lists.hq.nasa.gov

QE/QS:

FYI RE: NASA PRA

johnl

From: "Schilder, Craig, Mr, OSD-ATL" <Craig.Schilder@osd.mil>
To: "John lemke (JLemke@hq.nasa.gov)" <JLemke@hq.nasa.gov>
Subject: Assessing the Odds of Catastrophe.htm
Date: Thu, 6 Feb 2003 08:40:35 -0500
X-Mailer: Internet Mail Service (5.5.2653.19)

February 6, 2003

Assessing the Odds of Catastrophe

By SETH SCHIESEL

POWERFUL hurricane tears through Florida.

A nuclear power plant fails.

A space shuttle breaks up on its descent.

The world is full of risks. Some, like catching a cold, can usually be shrugged off. Others, like car crashes, are more serious, but the risks can easily be understood.

Then there are risks like nature's fury, nuclear meltdowns and spacecraft calamities: events that are infrequent yet catastrophic. Their potential damage demands that the risks be minutely assessed. Their rarity makes that task especially tough.

But a rapidly evolving set of conceptual and computing tools allow mathematicians, engineers and

insurance executives to assess the risk of what are euphemistically known as low-probability, high-consequence events.

The field, known in professional jargon as probabilistic risk assessment, helps companies and government agencies decide whether they are prepared to take the chances involved.

In 1995, these tools helped a NASA consultant estimate the risk of a catastrophic space shuttle failure at 1 in 145, or about 0.7 percent, for each mission. NASA accepted that risk. Similar methods are used to estimate the health risks at toxic-waste sites, to secure nuclear laboratories, weapon stockpiles and power plants, and to determine the safety and reliability of planes and cars. They help determine home insurance rates for tens of millions of people in the United States, Europe and Japan. And now some of the techniques are being used to analyze the chances of terrorist attack.

The concepts were developed four decades ago, but recent advances in computing power have increased both the use of such analyses and the confidence in them.

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In that sense, the insurance-related modelists focus on effects while the industrial modelists are trying to understand root causes of potential problems.

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A category that is now a focus of the Columbia investigation, the craft's protective tiles, was considered a less likely cause - with a 14.8 percent likelihood - of a catastrophic failure.

Probabilistic models, of course, are only as useful as the assumptions fed into them. Moreover, they are best used when a system or piece of equipment is being designed, not after it is in the field or in space.

"The most applicability is in the manufacturing of satellites," said James B. Frownfelter, chief operating officer of PanAmSat, the No. 1 commercial satellite-services company. "It is extremely important to employ these tools early in the process. Doing this at the beginning allows you to determine where to focus your testing and your overall cost profile."

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For all of the difficulties of modeling complex technical systems, however, the most daunting challenge may be modeling minds. That is because the next frontier in assessing the risks of "low-probability, high-consequence events" is terrorism.

In describing the challenge of modeling terrorism, Hemant H. Shah, chief executive and president of RMS, a risk-modeling firm, echoed Einstein's adage: "Subtle is the Lord, but malicious he is not."

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Ms. MacIntyre, the risk-assessment expert from Lawrence Livermore, seemed to have one piece of advice. "You're trying to focus on those things that are important," she said, speaking generally. "You can't model all of reality. What would be the point?"

To: Pete Rutledge <prutledg@hq.nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Fwd: Assessing the Odds of Catastrophe.htm
Cc:
Bcc:
Attached:

Yes, I did. It says that NASA declined to comment on risk assessment <u>for this article</u> and I have no idea whom they contacted; it was not me.

At 07:24 PM 2/6/2003 -0500, you wrote:
 Michael, Did you see this? It says NASA declined to comment on its use of risk assessment.

Pete
 X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-qe using -f
 X-Sender: jlemke@mail.hq.nasa.gov
 X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
 Date: Thu, 06 Feb 2003 09:11:17 -0500
 To: code-qe@lists.hq.nasa.gov, code-qs@lists.hq.nasa.gov
 From: jlemke <jlemke@hq.nasa.gov>
 Subject: Fwd: Assessing the Odds of Catastrophe.htm
 Sender: owner-code-qe@lists.hq.nasa.gov

QE/QS:

FYI RE: NASA PRA

john!

  From: "Schilder, Craig, Mr, OSD-ATL" <Craig.Schilder@osd.mil>
  To: "John lemke (JLemke@hq.nasa.gov)" <JLemke@hq.nasa.gov>
  Subject: Assessing the Odds of Catastrophe.htm
  Date: Thu, 6 Feb 2003 08:40:35 -0500
  X-Mailer: Internet Mail Service (5.5.2653.19)

February 6, 2003

Assessing the Odds of Catastrophe

By SETH SCHIESEL

POWERFUL hurricane tears through Florida.

A nuclear power plant fails.

A space shuttle breaks up on its descent.

The world is full of risks. Some, like catching a cold, can usually be shrugged off. Others, like car crashes, are more serious, but the risks can easily be understood.

Then there are risks like nature's fury, nuclear meltdowns and spacecraft calamities: events that are infrequent yet catastrophic. Their potential damage demands that the risks be minutely assessed. Their rarity makes that task especially tough.

But a rapidly evolving set of conceptual and computing tools allow mathematicians, engineers and insurance executives to assess the risk of what are euphemistically known as low-probability, high-consequence events.

The field, known in professional jargon as probabilistic risk assessment, helps companies and government agencies decide whether they are prepared to take the chances involved.

In 1995, these tools helped a NASA consultant estimate the risk of a catastrophic space shuttle failure at 1 in 145, or about 0.7 percent, for each mission. NASA accepted that risk. Similar methods are used to estimate the health risks at toxic-waste sites, to secure nuclear laboratories, weapon stockpiles and power plants, and to determine the safety and reliability of planes and cars. They help determine home insurance rates for tens of millions of people in the United States, Europe and Japan. And now some of the techniques are being used to analyze the chances of terrorist attack.

The concepts were developed four decades ago, but recent advances in computing power have increased both the use of such analyses and the confidence in them.

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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!

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-q
using -f
X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Thu, 13 Feb 2003 07:17:30 -0500
To: smadir@hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Source of Some Good Information that has been Released to the
  Public Domain
Cc: code-q@lists.hq.nasa.gov
Sender: owner-code-q@lists.hq.nasa.gov

Dear SMA Director,

The charter for the investigation has been amended as a direct result of yesterday's hearing.
This and additional information can be found at:

http://www.nasa.gov/columbia/COL_resources.html

****
James D. Lloyd   (Jim)

Acting Deputy Associate Administrator
Office of Safety and Mission Assurance
Headquarters Room 5U11
desk phone   202-358-0557

fax   202-358-3104

"Mission success stands on the foundation of our unwavering commitment to safety"
Administrator Sean O'Keefe January 2003

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-q using -f
X-Sender: prichard@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Thu, 13 Feb 2003 10:24:47 -0500
To: code-q@lists.hq.nasa.gov
From: Pamela Richardson <prichard@hq.nasa.gov>
Subject: POC at LaRC for Columbia information requests
Sender: owner-code-q@lists.hq.nasa.gov

Recently, a friend of mine from LaRC called to offer information to our Columbia efforts on research done at LaRC in the early 80s regarding on-orbit tile repair for Shuttle. With Pete's help, I was able to obtain the information and it has been provided to Mark Kowaleski and Ron Moyer. Anyone is welcome to make a copy, it is in my office.

Through the effort, I did, in my thank yous to the people at LaRC, ask if LaRC has defined a POC for Columbia information requests. Del Freeman has named Mark P. Saunders, Deputy Director, Space Access and Exploration Program Office, as that person. (m.p.saunders@larc.nasa.gov). In my communications, I indicated that if LaRC could provide such a name, I would ask all of Code Q to work through that person.

Thanks, Pam
~~~~~~
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
~~~~~~

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-insrp using -f

X-Sender: jlyver@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Fri, 14 Feb 2003 15:48:32 -0500
To: (Recipient list suppressed)
From: "John W. Lyver, IV" <jlyver@hq.nasa.gov>
Subject: Excellent STS-107 Disaster Presentation
Sender: owner-insrp@lists.hq.nasa.gov

The below link is to a FLASH movie made by USA Today. It is VERY well done!
  http://www.usatoday.com/graphics/news/gra/gshuttle_disaster/flash.htm

John

****
  John W. Lyver, IV - C.S.P.
  NASA Headquarters - Code QV
  Office of Safety and Mission Assurance
  Washington, DC 20546-0001
  (w) 202/358-1155 (fax) 202/358-3104

    "Safety vigilance is not negotiable, lives are at stake"
****

X-Sender: afeinber@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Fri, 28 Feb 2003 11:58:31 -0500
To: mstamate@mail.hq.nasa.gov
From: Alan Feinberg <afeinber@hq.nasa.gov>
Subject: Houston Chronicle Interview
Cc: HCAT <hcat@hq.nasa.gov>, abeutel@hq.nasa.gov, mmotiche@hq.nasa.gov

Mike -

Eric Berger of Houston Chronicle called and wants that PRA interview. How does Monday am work for you?

Please advise. I'll call him back and let him know we're trying to work that.

Thanks,

al f.
358-4504

To: Alan Feinberg <afeinber@hq.nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Houston Chronicle Interview
Cc:
Bcc:
Attached:

Monday at 8 or 9 AM is OK. Later is problematic.

At 11:58 AM 2/28/2003 -0500, you wrote:
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Thanks,

al f.
358-4504

To: Mark Kowaleski <mkowales@hq.nasa.gov>
From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Fwd: Clarify Answer for PRA question
Cc:
Bcc:
Attached: C:\Documents and Settings\mstamate\Desktop\PRA estimates vs. demonstrated estimates.doc;

Mark:
Is this better?
Michael

At 03:43 PM 2/27/2003 -0500, you wrote:
Michael, can you take a shot at simplifying this answer? I understand it, but I guess they want baby talk.
This a Columbia Action Center (Greenfield) action.

Thanks,

Mark

X-Sender: smcgrath@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Thu, 27 Feb 2003 15:13:56 -0500
To: mark.m.kowaleski@hq.nasa.gov
From: Sally McGrath <smcgrath@hq.nasa.gov>
Subject: Fwd: Clarify Answer

Date: Thu, 27 Feb 2003 15:11:55 -0500
To: mark.m.kowleski@hq.nasa.gov
From: Sally McGrath <smcgrath@hq.nasa.gov>
Subject: Clarify Answer

Mark, I failed to give this to you at the CAC meeting. Can you have someone re-word this so that it's understandable? Thanks.
Sally McGrath

X-Sender: afeinber@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Fri, 28 Feb 2003 15:44:55 -0500
To: Michael Stamatelatos <mstamate@hq.nasa.gov>
From: Alan Feinberg <afeinber@hq.nasa.gov>
Subject: Re: Houston Chronicle Interview
Cc: abeutel@hq.nasa.gov, mmotiche@hq.nasa.gov, HCAT <hcat@hq.nasa.gov>

Mike -

We're set for 9am Monday. Below are questions Mr. Berger sent along at my request.

"Mr. Feinberg/Dr. Stamtelatos --

Thanks for granting me an interview. I'm working on a story about the use of probabilistic risk assessment and other risk methods at NASA. Among the questions I am interested in are:

1. How far has NASA come in its efforts to institute a rigorous probabilistic risk assessment of the space shuttle. Has this been used to calculate an overall risk factor?

2. Have decisions on shuttle upgrades ever been based on PRAs as opposed to "design for minimum risk?" (i.e. I believe In 1996 Dan Goldin said moving to a PRA-based method should be a priority).

3. Is PRA a better method than "design for minimum risk?"

4. What are the challenges to implementing the use of PRA agency wide?

5. Have PRA methods been used in the design and operation of the International Space Station?

6. Why doesn't NASA require its contractors to include a comprehensive PRA for components/equipment when its contractors deliver these products?

7. Is NASA likely to change its risk assessment methods in light of the Columbia tragedy? (I realize it may be too early to answer this question.)

Thanks very much.

Eric Berger
Houston Chronicle Science Writer"

See you at 9am Monday, tape recorder in hand! Have a good weekend!

al f.

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Washington, DC 20024
Phone: 202/358-1668   Fax: 202/358-2778
E-mail: Michael.G.Stamatelatos@nasa.gov
(Please note change in e-mail address)
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"Mission success starts with safety"

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From: Michael Stamatelatos <mstamate@hq.nasa.gov>
Subject: Re: Houston Chronicle Interview
Cc:
Bcc:
Attached:

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At 03:44 PM 2/28/2003 -0500, you wrote:
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At 12:58 PM 2/28/2003 -0500, you wrote:
Monday at 8 or 9 AM is OK. Later is problematic.

At 11:58 AM 2/28/2003 -0500, you wrote:
Mike -

         ᵔf Houston Chronicle called and wants that PRA interview. How does Monday am
work for you?

Please advise. I'll call him back and let him know we're trying to work that.

Thanks,

al f.
358-4504

****
    Dr. Michael Stamatelatos
    Manager, Agency Risk Assessment Program
    NASA Headquarters - Mail Code QE
    Office of Safety and Mission Assurance
    300 E Street, SW
    Washington, DC 20024
    Phone: 202/358-1668 Fax: 202/358-2778
    E-mail: Michael.G.Stamatelatos@nasa.gov
    (Please note change in e-mail address)
****
    "Mission success starts with safety"

From: "Jones, Mike" <MEJones@comdt.uscg.mil>
To: "Faith Chandler (E-mail)" <fchandle@hq.nasa.gov>
Subject: Columbia
Date: Mon, 3 Feb 2003 11:18:40 -0500
X-Mailer: Internet Mail Service (5.5.2653.19)

Faith,

Don't know if you are engaged in the Columbia investigation, but if so then
please let me know if I can help you in any way.

Regards,

Mike Jones
Anteon Corporation
United States Coast Guard HQ (G-WDW)

mejones@comdt.uscg.mil

X-Sender: prichard@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 10 Feb 2003 09:45:38 -0500
To: Jerry.Cook@msfc.nasa.gov
From: Pamela Richardson <prichard@hq.nasa.gov>
Subject: Documents for HQ/Columbia
Cc: Faith.Chandler@hq.nasa.gov, Jim.Reuter@hq.nasa.gov

Jerry --

In the tagup between MSFC and HQ/Rogacki this morning, the MSFC team indicated that you could provide the following documents for the HCAT here at HQ.

1994 NASA, "Access to Space Study"

1999 NASA, "Space Transportation Architecture Study"

My understanding is that they are in hard copy form only. If so, please send them out overnight to me at HQ (address below on my .sig file). If not, please e-mail them to me.

Thanks, Pam Richardson
~~~~~~
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
~~~~~~

X-Sender: prichard@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Mon, 10 Feb 2003 11:33:30 -0500
To: "Cook, Jerry" <Jerry.Cook@msfc.nasa.gov>
From: Pamela Richardson <prichard@hq.nasa.gov>
Subject: Re: Documents for HQ/Columbia
Cc: Faith.Chandler@hq.nasa.gov

Thanks!

Pam

At 10:21 AM 2/10/2003 -0600, you wrote:
  Pam,

  I have several individuals looking for the documents listed below. I have a hard copy of the
  "Access to Space Study" but will have to send through reproduction to make copies. The STAS
  is a little more complicated. There are several versions (STAS, STASII, STASIII....) I will make
  sure you receive a copy as soon as I verify the requested version and can locate it either
  electronically or in hard copy.

  thanks

  Jerry

  Jerry --

  In the tagup between MSFC and HQ/Rogacki this morning, the MSFC team indicated that you
  could provide the following documents for the HCAT here at HQ.

  1994 NASA, "Access to Space Study"

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  My understanding is that they are in hard copy form only. If so, please send them out overnight
  to me at HQ (address below on my .sig file). If not, please e-mail them to me.

  Thanks, Pam Richardson
  ~~~~~~
  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
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  "We have to learn to manage information and its flow. If we don't, it

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

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--

Jerry R. Cook
Program Planning and Control Office
256-544-1229

~~~~~~

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
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6. Challenge for Columbia investigators: handling classified information

COLORADO SPRINGS, Colo. - One challenge facing the board investigating the breakup of the space shuttle Columbia is deciding how to handle potentially sensitive information from a variety of government sensors that monitored the orbiter in its final minutes.

Any data gathered by ground-based missile defense radars, for instance, "could be and probably is classified if it would reveal ... operational capabilities," said Lt. Col. Andy Roake, a spokesman for Air Force Space Command (AFSPC) at Peterson Air Force Base here.

"I know that they're working out the processes" for using such information in the investigation, he said. "The Air Force is committed to providing them with any kind of information that will help. ... It may be just a matter of providing the few people who are part of the investigation [with] that data and basically allowing them to see that on an as-needed basis."

The quantity of data probably won't be a problem. "We have a lot of capability in this country in our national means and there was a lot of attention directed" at the shuttle's return because interest in such events is always high, Michael C. Kostelnik, NASA's deputy associate administrator for the space shuttle program, said last week. He said it's "not unusual ... for a lot of entities to take pictures because it exercises their system on a very useful target. That happens routinely whether you ask for it or not."

Beyond handling sensitive data from specific sensors will be the task of correlating such data from several sensors and linking it to information transmitted by the orbiter itself in its last minutes.

Among government sensors that may offer critical information are Defense Support Program early warning satellites and ground radars, a team intended to help confirm a missile attack. Both have a side mission of helping to monitor objects in space. One DSP satellite is parked over the equator near the East Coast of the U.S and another is located near the West Coast, according to Jeffrey Richelson, an intelligence expert with the Washington-based National Security Archive.

The Ballistic Missile Early Warning System (BMEWS) radars, AFSPC spokesman Roake said, are located at Eglin Air Force Base, Fla.; Thule, Greenland; and Fylingdales, United Kingdom. Two Pave Paws radars, located at Beale Air Force Base, Calif., and Cape Cod, Mass., also are designed to warn of missile attack.

A telescope at the Air Force Research Lab's Starfire Optical Range at Kirtland Air Force Base, N.M., has yielded an image of Columbia in its final moments, but its precise meaning apparently is not yet clear. Roake said the image

was "from a side telescope. It wasn't from the main Starfire optical scope, it was more like a spotting scope ... so it's kind of fuzzy. With the main telescope you could capture images a lot better."

Telescopes of the Ground-based Electro Optical Deep Space Surveillance (GEODSS) system, with one site in Socorro, N.M., may have captured images useful in the investigation, Roake said.

Information from GEODSS and similar systems routinely flows into AFSPC's 1st Space Control Squadron at Cheyenne Mountain, Colo., which normally passes it to NASA so the orbits of shuttles and the International Space Station can be adjusted to avoid space debris.

In the wake of the Columbia disaster, all information gathered by Department of Defense sensors is being sent to accident investigators through U.S. Strategic Command in Omaha, Neb., Roake said.
- Rich Tuttle

X-Authentication-Warning: spinoza.public.hq.nasa.gov: majordom set sender to owner-code-q using -f
X-Sender: jlloyd@mail.hq.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Version 4.3.2
Date: Thu, 13 Feb 2003 07:17:30 -0500
To: smadir@hq.nasa.gov
From: James Lloyd <jlloyd@hq.nasa.gov>
Subject: Source of Some Good Information that has been Released to the
  Public Domain
Cc: code-q@lists.hq.nasa.gov
Sender: owner-code-q@lists.hq.nasa.gov

Dear SMA Director,

The charter for the investigation has been amended as a direct result of yesterday's hearing. This and additional information can be found at:

http://www.nasa.gov/columbia/COL_resources.html

****
James D. Lloyd   (Jim)

Acting Deputy Associate Administrator
Office of Safety and Mission Assurance
Headquarters Room 5U11
desk phone   202-358-0557

fax   202-358-3104

"Mission success stands on the foundation of our unwavering commitment to safety"
Administrator Sean O'Keefe January 2003

From: "Jones, Mike" <MEJones@comdt.uscg.mil>
To: "Faith Chandler (E-mail)" <fchandle@hq.nasa.gov>
Subject: Columbia
Date: Thu, 13 Feb 2003 09:27:44 -0500
X-Mailer: Internet Mail Service (5.5.2653.19)

Faith,

Observe carefully the investigative processes and the political dynamics
concerning impartiality in the Columbia investigation. In the initial phases
of an investigation with the scope of this one, you can expect many people
to examine NASA culture and management. This should not detract from
determining the sequence of events that led to Columbia's demise. There
should actually be two investigations going on simultaneously, NASA culture,
mission, and purpose as well as the Columbia event itself.

The Boeing CEO is interested in finding a technical solution to whatever
happened to Columbia this time, however, if there is a next time, then some
other technical problem might appear. The shuttle as you well know is a
complex vehicle requireing complex upkeep. There are many opportunities for
errors to occur with the current shuttle design and concept of operation.
So, piece by piece, incident by incident fixes are not appropriate in the
long run. Last time it was O-rings, this time it's something else . . . and
so on. See what I mean?

Actions as a result of this investigation will, hopefully, no doubt affect
safety policy and culture at NASA for years to come.

Regards,

Mike Jones
Anteon Corporation
United States Coast Guard HQ (G-WDW)

mejones@comdt.uscg.mil