

Re: Orbiter can save itself!

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- *From:* "tomcat" <jlavine@xxxxxxxxxxxxxx>
 - *Date:* 12 Feb 2006 03:59:19 -0800
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Jorge R. Frank wrote:

John Doe <jdoo@xxxxxxx> wrote in <news:43EE5417.458DCAC0@xxxxxxx>:

"Jorge R. Frank" wrote:

Once RCO is installed, I don't think a human crew *can* take over.
The photos I've seen show the switch panels *removed* in order to install the RCO cable, so the switches would no longer be there for the crew to operate.

OK. That explains well why NASA wouldn't try this kit with a crew on board.

For this to work, the RCO kit would have to be field installable, right ?

That's the idea. It would be installed by the crew after safe haven is declared and before the crew egresses the orbiter for the station. For the SAIL tests, the RCO cable was installed by STS-121 commander Steve Lindsey.

Will they leave one on the station for a crew to install in a shuttle if necessary, or will every shuttle have its own RCO kit with it at all times ?

I think there's only going to be one RCO cable, and it will either rotate among the orbiters or be left on ISS.

Re: Orbiter can save itself!

Don't be silly. NASA chose timetagged commands because that's how the existing SPC capability works, not because they thought timetagged commands were better.

I was asking about the original design of the shuttle computers, not the current patch. Were timed commands the only technologically possible solution back when the shuttle was designed due to computer limitations ?

I don't know.

I'm sure there will be, from people who don't understand the relative risks involved.

What happens if during re-entry, the shuttle loses communications, but otherwise remains intact ? Would the shuttle still automatically switch to "glider" mode at some timed event, and try to manage without the air data probes ? Or would it continue to be in "re-entry interface" mode and essentially become a controlled ballistic re-entry falling in some random location ?

The former. The guidance software will transition from entry to TAEM to approach/landing on its own.

From the program point of view, would the "glider" mode be able to cope without the air data probes, using inertial systems to estimate airspeed ?

The nav software tries to cope with the lack of air data by deriving it from the onboard state. How well that works depends on how good the nav state is, and what the winds are like. It may work, but introduces enough risk that the ability to deploy the probes was deemed essential for RCO.

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JRF

Reply-to address spam-proofed - to reply by E-mail, check "Organization" (I am not assimilated) and think one step ahead of IBM.

Re: Orbiter can save itself!

(I am not assimilated yet either so I have to think one step ahead of everybody.)

Today, inertial guidance is a little chip that can do miracles. Ring lasers act as gyroscopes accurately calculating speed and direction changes regardless of cause. In fact, air data input is just about out of date. So, inertial guidance will do well for the 'black out' period of reentry.

GPS, however, is a little better overall since it combines current location with speed over ground as well as location of the runway to be used. So, switch back to GPS as soon as possible after 'black out'.

Computers can be programmed to do everything necessary including applying the brakes on landing. Today, the brakes are anti-lock so steady pressure is all that is needed. The parachute is deployed by a pullout knob, but this could be accomplished by a simple piston as well.

To what extent the Shuttle is fly-by-wire I don't know, but believe that computers and avionics have been recently upgraded. So, with fly-by-wire it is just necessary to insure proper inputs with a separate computer, or multi-tasking program, handling position inputs from I.G. or G.P.S., calculating the outputs to fly-by-wire based on the current position vs. the final runway landing.

If the Shuttle's computers aren't capable of handling this then a little stripped down PC can handle it just fine, feeding the outputs into the Shuttle computers — 3 pounds of extra weight, tops.

Countdown timers are almost as old fashioned as the paper tape computer used during the Apollo Missions. Today, a sophisticated algorithm can be used in that stripped down PC I mentioned. That should be a little better than the old paper tape timer.

Boeing (McDonnell Douglas) used some glideslope programs in experimental aircraft, so check them out. Why reinvent the wheel?

tomcat

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