
Human Spaceflight Emergency Operations: A Conversation with ESA Astronaut/Cosmonaut Reinhold Ewald

German Physicist and Astronaut Reinhold Ewald was a member of the MIR '97 Crew between February 10 and March 2, 1997. When an emergency arose on the 24th of February after an oxygen cartridge in the Quant Module exploded, the Cosmonauts were forced to put on their oxygen masks and subdue the ensuing fire. SpaceOps News (SoN) spoke with Dr. Ewald on the handling of this emergency by the crew and ground control.

SoN: To what extent could the crew rely on "ready to go" on-board procedures, and was the international crew composition reflected in the task descriptions?

Dr. Ewald: The procedures and the training proved to be very effective. The alarm chain went well; everyone was aware of the severity of the situation within seconds. The self-protection also was smooth. Each crew member picked a mask from pre-destined locations. And the authority of the Station Commander as first-line fire fighter and organizer was never in doubt. Despite the international composition of the six-person crew, divided into two groups, everyone worked according to the emergency procedures. And since MIR was outside of ground station contact at the time, all activities had to be postponed until the fire could be extinguished.

SoN: Who took the initiative for controlling the emergency: crew or ground? Was the responsibility shifted during the on-going activities?

Dr. Ewald: Clearly the crew took the initiative and then the Station Commander (expedition crew no. 24, Valeri Korsun)



SoN: How was the voice link handled: conferencing or point-to-point

communications?

Dr. Ewald: As there was no voice link to ground, reporting was postponed to (a) radio amateur equipment in the blind (b) first contact to US ground stations known to be in listening mode

SoN: Could the Ground react to the evolving situation by relying on prepared procedures or was instantaneous, non-procedural decision making required?

Dr. Ewald: The ground in a short message confirmed that the crew had taken the right measures. After re-establishment of communications, medical advice was given, using most of the available, onboard resources to analyse and measure potentially harmful atmospheric components. Due to the inavailability of the oxygen producing devices, some restrictions on exhaustive activities were imposed, such as the daily sports, etc.

SoN: What are the regulations during communication outages with respect to decision making?

Dr. Ewald: A clear line of command with the Station Commander on top. Individual actions are ruled by procedures (switch off science instrumentation; save important science results for downtransport; prepare the Soyuz spacecraft for immediate return, etc.) and executed by command.

SoN: Was Ground control emergency staffing required, and how fast could it be deployed?

Dr. Ewald: The Russian reaction was as quick as possible in switching an otherwise idle ground station into operation. The information to the US partners and the German flight support team was not effective and later led to criticism.

SoN: Is International Ground support from other Agencies (NASA, ESA) foreseen? If so – what are the criteria for requesting it?

Dr. Ewald: In such a situation, the crew is not picky in whom to inform and what means to use. Only afterwards a certain reporting discipline was installed by the Station Commander. During later debriefings, different perceptions of the severity of the incident could be interpreted.

SoN: How did you vent the module, and how long did it take to resume nominal operations after the incident?

Dr. Ewald: After the extinguishing of the fire itself, which was now visible only to the front fire fighter, V. Korsun, the crew, wearing full protection masks, decided to use the maximum resource time available (known to be 2 1/2 hours)

to try to clean the atmosphere from smoke, steam, and solid particles emanating from the fire site. To this respect, all air purification units were switched to highest gear throughout, and an additional handheld filter/ventilation unit was used. Sight and smoke cleared within 1 1/2 hours in most modules, and the crew decided to go on, even without the masks (spent in the meantime) as long as no one showed signs of oxygen depletion or other anomalies. After a thorough wash down of all station surfaces and a complete change of clothing (sealed in bags), part of the crew was back at scheduled work in a matter of 8 to 10 hours after the incident. The commander and his board engineer assessed the damage and workarounds, which took away most of the communication sessions of the day. A press conference for the German programme had to be cancelled in the course of this contingency mode activity.

SoN: In hindsight, was there anything that should have been handled differently?

Dr. Ewald: Some -- perhaps 2 or 3 -- of the extinguishers were not properly attached and serviced; therefore, they failed to activate. Until they could be replenished with the next transport, there was a risk if another such accident would have occurred. The use of extinguishers based on water spray, in this case, saved the day (and maybe the station) as it would not have been possible to suffocate the fire source with the help of the CO₂ or halon gas used on ISS. The masks worked fine in the end, though we asked for real-time experience in future training, to be prepared for the unexpectedly slow initiation of the oxygen-supplying process.

SoN: Was the MIR`97 experience entered in procedure updates as lessons learned?

Dr. Ewald: I think the awareness that it actually had happened helped during training sessions thereafter to alert station crews to these emergency procedures. Luckily we did the right thing, and the equipment saved us and the station. To my knowledge, no adverse health impact has been recognized, to date, from this incident.

SoN: Did you personally earn any additional credentials by living through the emergency and handling it so well?

Dr. Ewald: No. I am often asked to tell the story, like in this interview. I do it, but at the same time also like to point out the good science results we were able to bring down from this mission. There is a good report out in a book called Dragonfly by Brian Burrough, though it overstates the discrepancies naturally contained in the individual crew members' reports.

SoN: Dr. Ewald, thank you for taking the time to talk to us today.

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