



# Friends or Foes?

## The NASA and Contractor Relationship

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# Lesson Objective

- Illustrate the benefits of NASA and contractors working TOGETHER to resolve issues by:
  - Examining the development of the Human Research Facility (HRF) Refrigerated Centrifuge (RC).
  - Identifying decision points and key elements crucial to the success of the HRF RC.
  - Suggesting attributes for other NASA/contractor teams to consider for their projects.

# HRF Overview

- An on-orbit laboratory for conducting research experiments regarding physiological, behavioral, and chemical changes induced by spaceflight.
- Data gathered will provide insight into the adaptation of crewmembers to ensure crew health and performance for future exploration and return to Earth.
- First ISS Facility Class Payload
  - HRF Rack 1 launched March 8, 2001, on STS-102/Flight 5A.1
  - HRF Rack 2 to launch on STS-114/Flight ULF 1 in March 2003



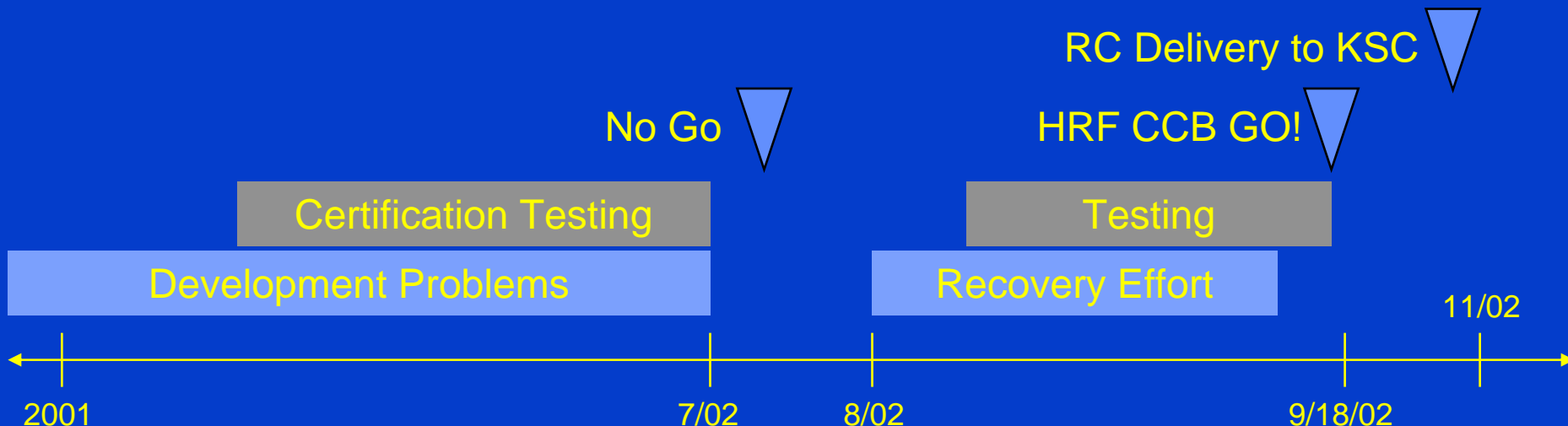
# RC Overview

- A mechanical device used to separate substances of differing densities in a controlled temperature environment.
  - 0.5 to 50 ml sample sizes
  - Refrigeration of the rotor chamber from ambient to +4°C
  - Selectable speed from 1000 to 4000 g
- Two major subsystems were subcontracted
  - Oil-free Compressor
  - Power Supply



# RC Timeline and Decision Points

- Continuous development problems – Vendors behind schedule, issues with compressor development, failed vibration testing.
- “No Go” Meeting – With continued failures and no schedule relief, removed the RC from Rack 2.
- “Go” at HRF CCB – With launch slip, work both replacement plan and RC recovery plan for Rack 2 delivery.
- Go for Delivery! – Activity to keep the RC in Rack 2 and launch.



# Continuous Development Problems

- Contractor Perspective
  - Proposed alternative compressor design for redundancy.
  - Utilized team technical knowledge and capability to resolve design/workmanship issues.
  - Presented resolutions and schedule workarounds to NASA contractual and HRF program customers.
- NASA Perspective
  - Evaluated resolutions and agreed with forward path, including additional funding.
  - Understood project was at risk overall but believed contractor skills and leadership (past and current history) in place to resolve.
  - Accepted increased visibility and need for communication to upper management.
- Summary
  - Built an open communication path and frequency need.
  - Shared NASA and contractor acceptance of risk.

# “No Go” Meeting

- Contractor Perspective
  - Team unsure of vendor-provided power supply with no planned backup.
  - Task overrunning from failure resolutions.
  - Failures were technically recoverable with team skills but schedule was critical. Created differing viewpoints within team on resolution.
  - Best option was to remove the RC from Rack 2.
- NASA Perspective
  - Knew true “broke.”
  - Accepted risk that keeping the RC was not worth risking Rack 2.
  - Replacing the RC would require additional funding.
- Summary
  - Important lesson learned regarding backup plans to critical components.
  - Mutual agreement that the program needs/benefit more important than project, which was conveyed to management.
  - Maintained trust and communication.

# “Go” at HRF CCB

- NASA Perspective

- Accepted that “No Go” decision lacked answer to “What if More Time?” Pushed the issue to contractor and HRF team.
- Continuously postponed final “Go” that consumed more schedule.
- Selected dual path – pursue RC recovery efforts AND still work RC replacements.
- Agreed to protect dual paths for as long as possible, which meant different information to different organizations.

- Contractor Perspective

- All HRF contractor groups worked as a team (RC, training, operations, and integration) to develop the RC and replacement plans. Problem resolution truly owned by all contractors.
- Contractor management saw this opportunity as a chance to rise above the failures and shine.
- Requested more funding for more activity – RC and Rack Integration.
- RC team was motivated and ready to rise to the challenge.

# “Go” at HRF CCB (concluded)

- Summary

- True, integrated decision to “Go!”
- NASA and contractors accepted risk of failure, at an individual and team level.
- Recognized need for a backup plan.
- NASA and contractors were a consolidated front, knowing redundant paths would create confusion (weight/cg, KSC integration) but knew how to respond.

# Go for Delivery!

- Contractor Perspective
  - Contractor management ensured all support organizations worked the RC as priority.
  - Sacrifice to personnel, overtime.
  - Increased communication within contractor team and management, as well as NASA, on progress and/or problems.
  - Continuous negotiation of schedule – RC, Rack Integration, KSC, ISS Program.
- NASA Perspective
  - NASA management ensured all NASA support organizations gave priority to RC.
  - No micromanagement.
  - Increased communication to upper management.
- Summary
  - Established priority and worked as such.
  - Integrated effort at all levels.
  - Currently integrated in HRF Rack 2 inside the MPLM, hatch closed.

# NASA/Contractor Relationship

## Lessons Learned

- Know and understand capabilities/attitudes of NASA and contractor personnel – technical ability, leadership, work ethic, etc.
- Establish and maintain an open communication path.
  - Builds and maintains trust.
  - Facilitates increase/decrease in frequency.
  - Allows for better, timely information to upper management.
  - No “blame game” environment.
- NASA and contractor share risk AND rewards, personally and professionally.

# NASA/Contractor Relationship Lessons Learned (concluded)

- Integrated effort at all levels, unified front.
  - No need for typical micromanagement.
  - Facilitates setting and maintaining priorities.
  - Maintains motivation and willingness to sacrifice.
- Evaluate against “big picture.” Accept program benefit may outweigh project completion.
  - Facilitates funding, schedule, and project decisions.
- Understand and evaluate decision points. Led to professional growth.
  - Balance of implementing recovery vs. meeting near-term milestones.
  - Backup plans to critical components.
  - Ramifications of decisions – weight/cg and dual paths.

# Conclusion

Success is not guaranteed as an integrated project team with open communication and shared ownership between the NASA and contractor members. However, the likelihood is greatly improved, and it makes for a better work environment.

