COE CST Fifth Annual Technical Meeting

Task 309: Assessment of Screening and Training Requirements for Pilots with Repeated Exposures to Sustained High Acceleration

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Center of Excellence for Commercial Space Transportation

Agenda

- Team Members
- Task Description
- Schedule
- Goals
- Results
- Conclusions and Future Work

Team Members

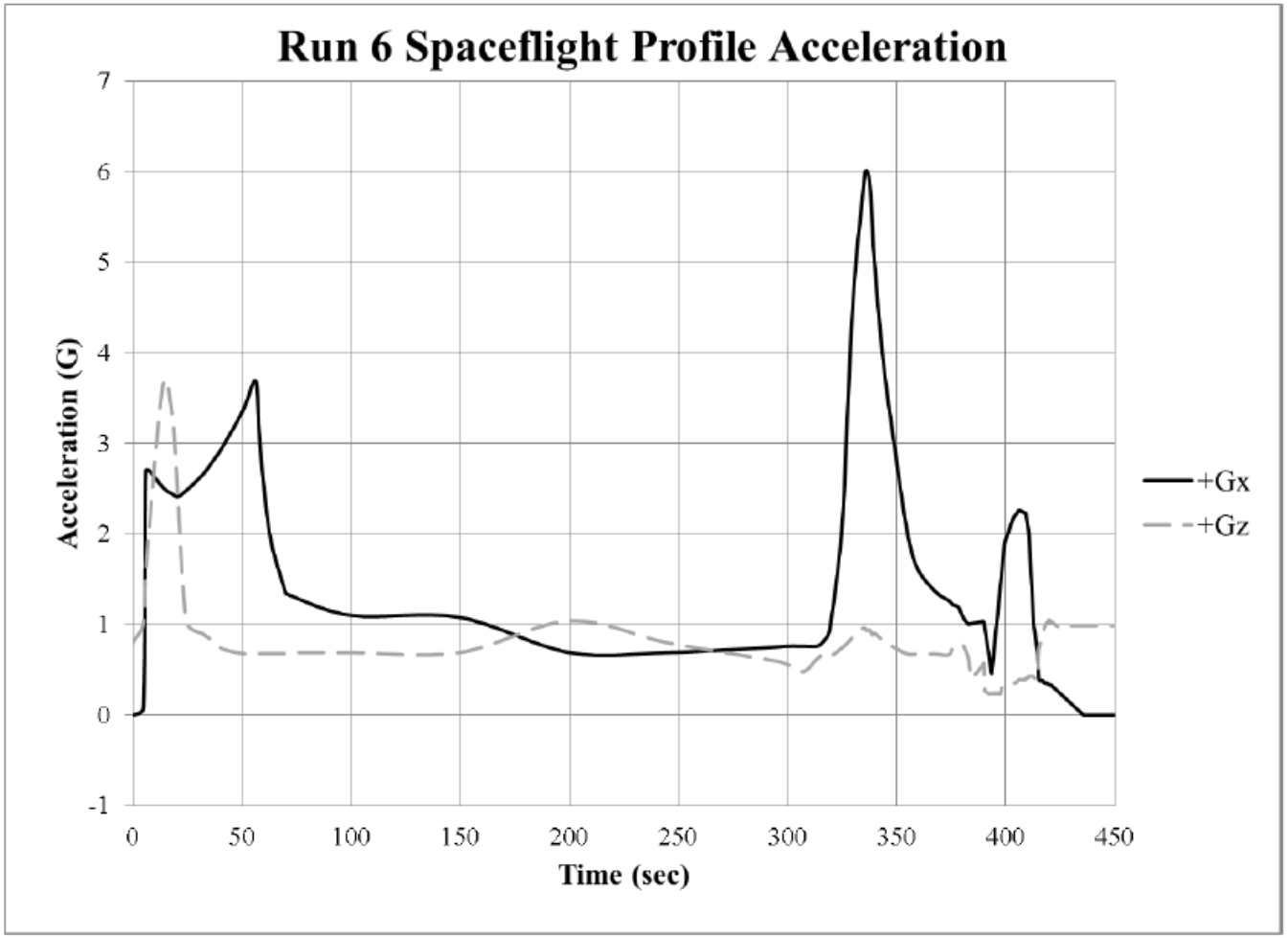
- Principal Investigator: James Vanderploeg, MD
- Co-Investigators: Rebecca Blue, MD; Tarah Castleberry, DO; Charles Mathers, MD
- Residents: **Benjamin Johansen, DO**; Robert Mulcahy, MD; James Pavela, MD; Rahul Suresh, MD

- Organizations
  - NASTAR Center – Matching Funds
  - Virgin Galactic

Task Description

- Repeated exposure of the flight crew to sustained high +Gx and +Gz acceleration in highly demanding spaceflight profiles is a new and untested paradigm.
- Identifying the unique physiological challenges and medical clearance requirements will enable spaceflight operators to ensure safe operations.

Vehicles


Run 6 Spaceflight Profile Acceleration
Acceleration (G)
7
6
5
4
3
2
1
0
-1
0
50
100
150
200
250
300
350
400
450
Time (sec)
+Gx
+Gz

Task Description

Suborbital spaceflight profiles

- Combined +Gx and +Gz
- Peak +6.0Gx/+4.0Gz

Repeated exposures

Schedule

- Complete IRB approval process
- Recruit pilots for research study
- Conduct aerobatic flights and NASTAR testing throughout 2016
- Conduct physiological monitoring during spaceflights in 2016/2017

Goals

- Compare pilot performance and physiological response in aerobatic flights, centrifuge acceleration profiles, and actual spaceflight.
- Develop recommendations for pilot training and medical screening.

Results

- Pending

Conclusions and Future Work

- Collecting early data on acrobatic pilots flying sustained $+G_z$ exposures (i.e. prolonged G pull-outs from a dive or tight turns)
- IRB research protocol being prepared

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utmb Health
Aerospace Medicine

Project At-A-Glance

- University: The University of Texas Medical Branch
- Principal Investigator: James Vanderploeg, MD
- Co-Investigators: Rebecca Blue, MD; Tarah Castleberry, DO; Charles Mathers, MD
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Relevance to Commercial Spaceflight Industry

- Repeated exposure of the crew to sustained high +Gx and +Gz acceleration in highly demanding spaceflight profiles is a new and untested paradigm. Identifying the unique physiological challenges and medical clearance requirements will enable spaceflight operators to ensure safe operations.

Statement of Work

- Compare pilot performance and physiological response in aerobatic flights, centrifuge acceleration profiles, and actual spaceflight.
- Develop recommendations for pilot training and medical screening.

Status

- Collecting early data on acrobatic pilots flying sustained G exposures
- IRB research protocol being prepared

Future Work

- Complete IRB approval process
- Recruit pilots for research study
- Conduct aerobatic flights and NASTAR testing throughout 2016
- Conduct physiological monitoring during spaceflights in 2016/2017