AGC = Apollo Guidance Computer

Baikonur Cosmodrome = Soviet launch site, not really in the city of Baikonur but, possibly in an attempt to deceive the U.S., built roughly 200 miles southwest in Tyuratam

Buck Rogers = A comic strip space adventurer from the 1920s

CAPCOM = Capsule Communicator = an astronaut at Mission Control who relayed information and instructions to the astronauts in space

CSM = Command and Service Module (Apollo)

Direct Ascent = a rejected lunar landing mode where all the equipment and all the astronauts go directly to the moon, and almost everything (all the astronauts, at least!) comes back

DSKY = the DiSplay and KeYboard for the AGC—Apollo astronauts liked this interface

EOR = Earth Orbit Rendezvous = a rejected lunar landing mode in which you assemble a spacecraft in Earth orbit before sending it to the moon

Equigravisphere = the point where the Earth’s and the moon’s gravity balance out

EVA = extravehicular activity = spacewalking

FIDO = Flight Dynamics Officer, responsible for the flight path of spacecraft

Flight = Flight Director = leader of the flight control team, which for Apollo missions included CAPCOM, FIDO, GUIDO, INCO, NETWORK, RETRO and more

Flight Operations Manual = the instructions for operating a spacecraft, including both normal (“nominal”) and emergency situations

Frau im Mond = “Woman in the Moon” in German = a 1929 movie for which Hermann Oberth, Wernher von Braun’s mentor, helped create the special effects

GET = Ground Elapsed Time = time since liftoff

Gimbal = a device used to move the rocket engines to keep a spacecraft pointed in the right direction—also used by astronauts as a verb to indicate what the device does

GUIDO = Guidance Officer = responsible for monitoring navigation systems, such as the AGC

Gulag = ГУЛАГ = Russian acronym for “The Chief Administration of Corrective Labor Camps and Colonies” = Soviet forced labor prisons

Handheld Maneuvering Unit = a device for moving around during an EVA—also called the Zot gun

Isaac Newton = a scientist (1643-1727) who discovered the basic laws of motion for bodies in space

LEM = LM = Lunar (Excursion) Module

LOI = Lunar Orbit Insertion = the rocket burn that puts a spacecraft into orbit around the moon

LOR = Lunar Orbit Rendezvous = the lunar landing mode for Apollo—and what the Soviets would have used as well, had they made it that far

LOS = Loss of Signal = temporary (you hope!) gap in communications while the moon, or the Earth, is in between the spacecraft and Mission Control

Glossary Continued on Inside Back Cover
GLOSSARY (Cont’d)

NACA = National Advisory Committee for Aeronautics—the government agency that was folded into NASA in 1958

O₂ = oxygen

OMNI = omni-directional antenna = used by the CSM to stay in touch with Earth while in Earth orbit, and then as a backup when near the moon

Orthographic projection = a method used by engineers for representing 3-D objects in 2-D

P-51 = the P-51 Mustang = the most successful Allied fighter plane from World War II—it was still used by some air forces in the 1980s, and a famous sports car is named after it

Pogo = bouncing motion—like a pogo stick—in a rocket during liftoff

Poyekhali = Пойехали = “Let’s go” in Russian

Retro-package/retro-rockets = a system used for slowing spacecraft down for re-entry into Earth’s atmosphere

Soyuz = Союз = “union” in Russian = the successor spacecraft to the Voskhod series, and what the Soviets hoped would land on the moon

Sputnik = Спутник = “satellite” in Russian = the first artificial, earth orbiting, satellite

TEI = Trans-Earth Injection = heading back home!

TLI = Trans-Lunar Injection = going to the moon!

T-minus = “Time minus” = the time before launch—first used in the movie Frau im Mond

Voskhod = Восход = “rising” in Russian = the successor spacecraft the Vostok series, which Alexei Leonov flew during the first spacewalk

Vostok = Восток = “east” in Russian = the Soviet program for human spaceflight which put Yuri Gagarin into orbit

Zero-g = freefall, where you don’t feel the effect of gravity (or the push of a rocket motor, which can feel a whole lot like gravity…and then some!)

Zond = Зонд = “probe” in Russian

AUTHOR and ILLUSTRATORS

Jim Ottaviani started writing graphic novels about science in 1997, including stories about physics, stage magic, and paleontology. T-Minus is his eighth book, and the second with art by Zander Cannon and Kevin Cannon. He used to work as a nuclear engineer, but now, in addition to being an author he’s also a librarian living in Ann Arbor, Michigan.

Zander Cannon and Kevin Cannon (no relation) have worked together since 2004, illustrating such books as Bone Sharps, Cowboys, and Thunder Lizards by Jim Ottaviani and The Stuff of Life by Mark Schultz. Zander earned two Eisner awards for his work on the Top Ten series with Alan Moore and Gene Ha. Both Cannons reside in Minneapolis.

For more T-Minus extras, visit www.gt-labs.com/tminus.html