附件 4

中国新闻奖参评作品推荐表

<table>
<tr><td rowspan="3">作品标题</td><td colspan="2" rowspan="3">《飞向月球》(国际版)</td><td>参评项目</td><td>专门类-国际传播</td></tr>
<tr><td>体裁</td><td>纪录片</td></tr>
<tr><td>语种</td><td>普通话、粤语、英语、德语、阿语、俄语、日语、韩语</td></tr>
<tr><td>作 者
(主创人员)</td><td>闫东、张啸、Michael Radtke</td><td>编辑</td><td colspan="2"></td></tr>
<tr><td>原创单位</td><td>中央广播电视总台社教节目中心、中国国际电视总公司、德国电视联盟集团、国家航天局新闻宣传中心</td><td>刊播单位</td><td colspan="2">法国 Canal+集团、瑞典 SVT 电视台、德国 ProSiebenSat1 集团</td></tr>
<tr><td>刊播版面
(名称和版次)</td><td>法国 Canal+ 集团的 Planete+频道
德国 ProSiebenSat1 集团的 Kabel 1 Doku 频道
瑞典 SVT 电视台</td><td>刊播日期</td><td colspan="2">法国 Canal+集团播出日期是 2020 年 10 月 23 号，2020 年 11 月 6 号，2021 年 3 月 12 号、25 号、26 号、31 号，2021 年 4 月 6 号、15 号，2021 年 10 月 6 号、15 号、21 号、22 号、27 号，2021 年 11 月 2 号、8 号；
瑞典 SVT 电视台播出日期是 2020 年 12 月 14 号、22 号，2021 年 8 月 11 号、13 号、14 号；
德国 ProSiebenSat1 集团播出日期是 2021 年 3 月 14 号，2021 年 8 月 17 号、18 号。</td></tr>
<tr><td colspan="2">新媒体作品填报网址</td><td colspan="3"></td></tr>
<tr><td>作品简介
(采编过程)</td><td colspan="4">《飞向月球》(国际版)是在五集版纪录片《飞向月球》的素材基础上进行改编，制作成 1 集 X60 分钟的版本，重点围绕人类对月球的探索历程，以及中国探月工程取得的成就，尤其是嫦娥四号在月球背面软着陆所蕴含的科学原理、科技创新等内容来展开，记录了嫦娥四号探测器发射、落月等重要的历史时刻，体现了中国智慧、中国创造以及中国在国际航天领域的新高度。同时为了更好地推进该《飞向月球》(国际版)国际发行和海外落地播出，该节目进行了普通话、粤语、英语、德语、阿拉伯语、日语、俄语、韩语等八个语言版本的制作，将在亚洲、欧洲进行全球同步播出。</td></tr>
</table>

社会效果	前德国宇航员乌利希•瓦尔特教授从西方视角对这次登陆进行了高度评价。 此次联合制作进一步深化了总台与欧洲主流媒体的合作关系，扩大了总台品牌的海外宣传效应。德国电视联盟首席执行官迈克尔•雷德克先生表示：“我们很高兴能与中央广播电视总台同仁共同完成这一激动人心的非凡项目。中国制作团队的工作令人叹为观止，这次合作非常愉快。” Canal+集团是法国知名视听媒体集团，其平台覆盖法国、非洲、波兰、越南和缅甸等，总用户人数高达 2030 万人。ProSiebenSat1 集团是一家知名德国大众传媒集团，其平台主要覆盖德国、奥地利和瑞士，平台每月视频观看次数超过 10 亿次。瑞典 SVT 电视台是瑞典国家电视台，每周共播出 106 小时，于 1956 年 9 月 4 日开播，如今拥有瑞典最大的电视广播网。
（推荐理由）初评评语	《飞向月球》（国际版），以荣获第十五届精神文明建设“五个一工程”的《飞向月球》纪录片为基础，突出国际视角，强化国际传播，聚焦中国探月重大进展，反映人类探月历程，该节目通过八个语言版本的制作，在亚洲、欧洲进行全球同步播出，面向世界讲好中国故事，传播中华文化，产生广泛影响。 **签名：** **（盖单位公章）** **2022 年　月　日**

宣传海报及专题网页截图：

《飞向月球》（国际版）文字

TC 时间码		Chinese lines 中文译文	English lines 英语译文
00.44- 00.53		月球背面 飞向月球	Dark Side Of The Moon The Landing
00:55	Narrator 解说	西昌卫星发射中心	The Xi'chang Satellite Launch Center,
00:57		2018 年 12 月 8 日 凌晨 1 点 23 分	December 8, 2018, 1:23 am.
01:02		一小时后	The world doesn't know it yet,
01:04		一次蔚为壮观的太空探险之旅即将出发	but in just one hour China will embark on one of the most spectacular adventures
		这个消息尚未公开	in the history of space travel.
01:13		探测器将飞到月球背面	A probe is about to journey to the dark side of the Moon,
01:16		首次在那里着陆	and for the first time land there.
01:20		人类还从未成功在月球另一面登陆	Mankind had never succeeded before in setting foot on the far side of the Moon.
01:25		这是一项危险重重的任务	It is a dangerous mission.
01:32		早在 1968 年	In 1968,
01:34		美国载人飞船阿波罗 8 号	the manned American space capsule Apollo 8
01:37		就曾经环绕月球飞行	orbited the Moon:
01:38		三名宇航员 弗兰克·博尔曼	Three astronauts Frank Borman,
01:40		威廉·安德斯和詹姆斯·洛弗尔	William Anders and James Lovell.
01:41		是最早肉眼看到月球背面的人	were the first humans to see the far side of the Moon with their own eyes.
01:45		威廉·安德斯回忆	William Anders remembers:
01:48	William Anders (OFF) (Mann 2) 威廉·安德斯 （画外音） （男乙）	它看起来就像我小时候玩的沙箱	It looked like the sandbox I played in when I was a child.
01:51		很多粗糙的陨石坑和边界模糊的壕沟	There were a lot of impact craters and ditches without sharp limitations.
01:57	Narrator 解说	就在几年前	Only a few years before,
01:58		中国刚刚发射了第一枚火箭	China had launched its first rocket.
02:01		中国于 1970 年将第一颗卫星送入轨道	In 1970, the People's Republic of China had sent its first satellite into orbit.

02:08		与此同时 美国宇航员	Meanwhile, American astronauts
02:11		在月球漫步期间收集了土壤样本	were collecting soil samples during a moonwalk.
02:15		1978 年	In 1978,
		美国人将月球石交给中国科学家进行研究	Chinese scientists were given samples of moon rocks for examination.
02:21		这是从岩石切割的一小块	They had to cut a small piece out of a big stone.
02:26	Ouyang Ziyuan (Mann 4) 欧阳自远（男丁）	当时从上面看	When you look at it today,
02:29		它大概有一个大拇指大	the rock looks like a big thumb.
02:32		他们在上面做了个凸透镜	There’s a convex len on top of it,
02:35		实际上是个放大镜	which magnifies its size.
02:36		所以真实的情况	But actually,
02:39		我在手套箱里面	after I opened the transportation box,
02:40		把它砸开有机玻璃以后	I found the rock inside
02:43		大概只有黄豆大小	was only about the size of a soybean,
02:47		称重的结果是 1 克左右	and weighed about 1 gram.
02:51		所以我当时下决心	So, I decided to do all the analytical testing work
02:54		用半克要完成全部的分析测试工作	using about half a gram.
02:59	Narrator 解说	直到新千年伊始	It was only at the beginning of the new millennium
		中国的太空计划开始突飞猛进	that China's space program really took off.
03:05		2003 年 随着强大发射器的开发	In 2003, after developing powerful rockets,
03:09		中国成功将人类送入太空	the country succeeded in putting a man into space:
03:11		宇航员 杨利伟	The astronaut was Yang Liwei.
03:14	Yang Liwei (Mann 3) 杨利伟 (男丙)	和平利用太空	Peaceful use of the universe
03:16		造福全人类	for the benefit of all humanity!
03:20	Narrator 解说	2005 年 第二次太空飞行搭载了两名宇航员	In 2005, two more astronauts were sent into space.
03:23		2008 年 搭载了三名中国宇航员	In 2008, three Chinese astronauts were on board the rocket.
03:28		这一次宇航员走出了太空舱	This time, the astronauts would brave getting out of the capsule.
03:31		实现了中国的第一次太空行走	It would be China’s first spacewalk.
03:35		全世界逐渐清楚地认识到	Slowly it became clear to the world that
03:38		在太空中找到另一个强大伙伴的愿望	China would soon become another strong partner in space.
		指日可待	

03:43	Prof Walter 瓦尔特教授	中国如愿以偿地实现了所有计划	They have actually implemented everything they said they'd do.
03:45		中国人做事不露锋芒	But they don't announce things with big a fanfare.
03:48		脚踏实地	They are more reserved.
03:50		我坚信在 2030 年 2031 年 或 2032 年	And that's why I am convinced that
		他们将会成功登月	they will set foot on the Moon in 2030, 31 or 32.
03:57	Narrator 解说	2012 年 由三名宇航员驾驶的另一艘宇宙飞船	In 2012, for the first time, three Chinese astronauts carried out
04:01		首次在太空中执行了对接操作	a docking maneuver in space.
04:04		对接对象是天宫一号空间站	They had intended to connect with the space station Tiangong 1, which means "Heavenly Palace" in English.
04:10		天宫一号一年前被送入轨道	which had been put into orbit a year earlier.
04:14		宇航员的任务是将太空实验室投入使用	The task of the crew was to get the space laboratory up and running
04:18		并开展针对人类在太空常驻的生物研究和医学实验	and to carry out biological and medical experiments to find out how long-term stays in space would affect the human body.
04:24		这一过程充满乐趣	They also found time to enjoy themselves.
04:32	Prof Walter 瓦尔特教授	中国未来将与美国并驾齐驱	In the future, the Chinese will be at the same level as the Americans.
04:38		中国宇航员不仅会奔向月球	They will not only fly to the Moon,
04:39		还会征服火星	but to Mars as well.
04:40	Narrator 解说	2007 年 中华人民共和国自主研制了一颗探测器	In 2007, the People's Republic of China developed its first probe
04:44		并将其送上月球	and sent it to the Moon.
04:46		探测器以中国月亮女神嫦娥命名	Named after the Chinese moon goddess "Chang'e",
04:49		经费约 1.69 亿美元	It cost roughly 169 million dollars to build.
04:52	Luan Enjie (Mann 2) 栾恩杰（男乙）	探索月球分两个问题来回答	The Moon Research Programme had two main objectives:
04:58		一个就是我们中国人有没有能力	The first was to prove that we had the ability
05:03		把探索月球的装置送到月球去探索	to get the right technology into space.
05:10		第二个才是要做出中国人	The second challenge was for China to contribute something unique
05:13		（对世界）有独特贡献的探索的内容	to the world's knowledge of space exploration.
05:19	Narrator	嫦娥一号探测器主要配备了高敏	Chang'e 1 was primarily equipped with a

	解说	相机	highly sensitive camera
05:23		和用于绘制月球表面的测量系统	and measuring systems to map the lunar surface.
05:28	**Prof Walter** 瓦尔特教授	如果我们想在月球着陆	For a successful landing on the Moon,
05:29		我们需要知道具体着陆点	it is important to find a suitable landing place.
05:32		这时我们首先要有精确的地图	So, on their first mission,
05:34		这是第一个任务的重点所在	the Chinese created a map,
05:36		尤其是在月球背面	primarily of the far side of the Moon,
05:39		需要准确显示着陆点区域	to find an even place to land their probe.
05:45	Luan Enjie (Mann 2) 栾恩杰 （男乙）	我火箭是成熟的	Our rocket was ready.
05:47		现在唯独比较难的一点就是测发控	The trickiest part was the launch and control system.
05:53		我对这个 我说实在情况	To be honest,
05:56		是最担心的	I was really worried about those aspects.
05:58	Narrator 解说	最重要的是	The first objective was
05:59		他们想测试用于执行未来太空任务的技术	to test technologies for future space missions.
06:04		结果一切顺利	Everything went to plan.
06:06		2007 年 10 月 探测器被送入太空	In October of 2007, the probe was launched into space.
06:10		经过 11 天的巡航	After eleven days,
		探测器成功进入月球轨道	it reached lunar orbit.
06;14		探测器在展开太阳能电池后	Weighing roughly two tons,
		重量超过 2 吨	its unfurled solar cell arms
06:20		宽 18 米	had a span of 18 meters.
06:31		当探测器接近月球时	Approaching the Moon,
06:33		速度约为 1 万公里/小时	the probe was traveling at over 10,000 kilometers an hour
06:38		因此近月制动是第一个挑战	- the braking process would be the first challenge.
06:41		万一失败	If this process failed,
		探测器或在月球表面失速坠毁	the probe would either crash onto the lunar surface
06:46		或越过月球飞向无限的太空	or miss the Moon altogether and head into the infinity of space.
06:53		但一切都如期进行	But everything went to plan.
06:55		北京航天飞行控制中心	When the control center in Beijing announced
06:59		公布近月制动成功时	a successful braking process,
07:01		人们欢呼雀跃	There was elation.
07:06	Ouyang Ziyuan	我觉得这是大家的期盼	I think it’s what we were all expecting.
07:10		绕起来啦 绕起来啦	Closer and closer.

	(Mann 4) 欧阳自远（男丁）	最后报告说 月球抓住了	Finally, it came the news that the spacecraft had entered a lunar orbit!
07:15		我们又请测控的同志	We then spoke to our measurement and control system colleagues
		你们是不是再测一次	and asked: Would you please check again?
07:19		现在已经开始绕月球	They confirmed that Chang’e-1 was flying
		为椭圆轨道绕月球飞行了	around the Moon in an elliptical orbit.
07:14		我觉得	I think
07:15		我们应该有能力来研究	we now must carefully evaluate all the data
07:17		我们中国自己探测到的数据了	we have gathered here in China.
07:22		我觉得这是最主要的	I think this is what is most important now.
07:24		以后还要一步一步要拿到样品	We need to double check every step of the way for future reference.
07:27		所以我想我们一定会	So I think we need to carry out
07:29		很坚定地 很顺利地走过去	this process resolutely and calmly.
07:36	Narrator 解说	嫦娥一号保持 200 公里的距离绕月飞行	At a distance of just over 200 kilometers,
07:41		使用 3D 相机持续拍摄照片	Chang'e 1 circled the Moon and continuously took photographs with a 3D camera.
07:45		探测器绕月球一周只需 127 分钟	It took a mere 127 minutes for the probe to circumnavigate.
07:51		高灵敏度的照相机和激光测距仪	Highly sensitive cameras and laser rangefinders made it possible,
07:55		使人类首次实现精确绘制月球三维地图	for the first time, to create an accurate 3D map of the Moon.
08:01		月球表面图像的精确绘制	Such precise imaging of the lunar surface,
08:04		这是空前的突破	before now, has never existed.
08:14	Prof Walter 瓦尔特教授	是的 美国曾提供过相关影像资料	Yes, the Americans had created maps before,
08:15			
08:17		但中国着陆地点影像的分辨率很低 达不到预期要求	but not in such high resolution and not of the landing place hoped for by the Chinese.
08:21		这是中国科学家自己绘制地图的原因	So, they had to create their own.
08:24		人们可以准确判断着陆时机	They needed to see exactly
08:25		清楚看到陆地目标地点的具体情形	what their desired landing site looked like.
08:29	Narrator 解说	在嫦娥一号成功完成任务后	After Chang'e 1 successfully accomplished its mission,
08:33		中国科学家面临幸福的烦恼	There was a question:
08:34		如何处理这颗珍贵的探测器呢	what to do with the valuable probe.
08:39	Luan Enjie	当时提出方法的人很多	Many people put forward suggestions at that

	(Mann 2)		time.
08:43	栾恩杰 （男乙）	但是比较好的提出来各种方案就是	We really like the idea of letting the probe
08:48		我们就撞月	simply crash onto the Moon,
08:52		就是把我们这个载荷（探测器）落到月球上	to act as a symbol on the Moon,
08:55		让月球有中国人的载荷（探测器）在	and to show that the Chinese people have reached the Moon’s surface.
09:00		用这点剩余的燃料	Using the remaining fuel,
09:04		做一点最后的牺牲和贡献	We could create a small lasting memorial.
09:11	Narrator 解说	这是一次宝贵的经历	And that's how it happened.
09:13		此外 他们希望从硬着陆中获取数据	In addition, the scientists wanted to get data from the hard landing,
09:17		为下一次软着陆做技术准备	to facilitate technical preparation for the soft landing to come.
09:23		2009 年 3 月 1 日	On March 1, 2009,
09:26		控制中心遥控月球表面的探测器	Chang’e 1 set course for the lunar surface,
09:30		直到最后一刻	accomplishing its mission
		她还在工作 发送照片	by sending images back to Earth until it crashes on the lunar surface..
09:33		嫦娥一号完成了她的使命	
09:44		短短一年后	One year later, in 2010,
09:45		中国发射了第二颗月球探测器嫦娥二号	China sent its next probe, "Chang'e 2", to the Moon.
09:50		这次配备了更强大的火箭	This time it was launched with a more powerful rocket.
09:52		准备完成另一个任务	It had a new mission:
09:54		更加精确地测量月球表面	an even more accurate measurement of the lunar surface.
09:59		并准备一次惊心动魄的邂诟之旅	And a dangerous encounter was in the planning.
10:02		嫦娥一号抵达月球用了 12 天	Whereas Chang'e 1 took 12 days to reach the Moon,
10:06		嫦娥二号把这个过程缩短为 5 天	Chang'e 2 covered the distance in just five days.
10:15		嫦娥一号飞到距月球 100 公里的地方	Chang'e 1 could only get within 100 kilometers of the Moon.
10:18		第二颗探测器抵达了距月球 15 公里的地方	But Chang’e 2 approached Earth's satellite within 15 kilometers.
10:24		相机的分辨率为每像素 1.5 米	With an on-board camera resolution of 1.5 meters per pixel,
10:28		这一次可以生成更精确的图像	the images were much more detailed than the previous ones.

10:34		最重要的是	The most important task was to
10:35		研究人员想为下一次任务找到一个好的着陆点	find a good landing site for their next mission.
10:39		其中一个着陆点为月面虹湾雨海区域	The choice would be "Mare Imbrium".
10:42		最初 人们误认这一浅平区是海洋	At first sight, the lowlands look like a sea.
10:44		事实上 这是小行星撞击的结果	In fact, the depression was caused by the impact of an asteroid.
10:50		唯一不适宜着陆的地点是拉普拉斯 A 撞击坑	The only unfavorable landing site is the "Laplace A crater"
10:55		直径约 9 公里 深约 1.7 公里	with a diameter of 9 kilometers and a depth of 1.7 kilometers.
11:00		在嫦娥二号数据还原的三维影像中清晰可见	This 3D reconstruction was created with data taken from Chang'e 2.
11:07		但中国研究人员为嫦娥二号	But China's researchers came up
11:10		布置了另一个非常艰险的任务	with another very dangerous and difficult mission for Chang'e 2
11:15		月球上的大部分环形山都由小行星	Most of the craters on the Moon are caused by asteroids,
11:18		以巨大速度撞击月球而形成	which hit at high speed and massive impact.
11:32		与地球不同	In contrast to Earth,
11:33		月球没有大气层作为防护罩	the Moon does not have a protective atmosphere
11:37		大气层可使来自太空的物体减速和部分燃烧	to slow down projectiles from space which partially destroys them by burning them up.
11:41		小行星越大	The larger the asteroid,
11:43		陨石坑就越大	the larger the crater.
11:45		屏障越少	And with no atmospheric shield like Earth’s
11:47		地面所受的冲击越大	to help slow it down.
11:49	Prof Walter 瓦尔特教授	最危险的小行星一般超过一米左右	The most dangerous asteroids are those which are broader than about a meter.
11:53		它们飞过并撞击大气层	They can get through the atmosphere
11:57		形成巨大的撞击效应	and hit Earth with a tremendous impact force.
11:59		它们可以将大部分地球表面夷为平地	They could simply destroy huge parts of Earth’s surface.
12:06	Narrator 解说	几百万年前的一次撞击	It was just such an impact
12:09		导致恐龙时代的终结	that sealed the fate of the dinosaurs millions of years ago.
12:20	Prof Walter 瓦尔特教授	显而易见 小行星的撞击极为危险	This shows how dangerous
12:25		尤其是大型小行星更为致命	such asteroids can be.

12:26		我们知道这种大型小行星的撞击	And we know that these asteroids cause impacts
12:30		几千年就会发生一次	every few thousand years.
12:35	Narrator 解说	小型小行星的撞击较为频繁	However, smaller impacts happen more frequently,
12:37		例如 俄罗斯这颗小行星撞击	like this one in Russia.
13:00		小行星在这次攻击中坠入湖中	One of the asteroids on this occatiion crashed into a lake.
13:05		也有一些较大的小行星危险地接近地球	But there are also much larger asteroids that have come dangerously close to Earth.
13:11		有这样一颗小行星叫做图塔蒂斯	Such an asteroid is "Toutatis“,
13:16		这是凯尔特人的战神名字	named after the Celtic God of War.
13:21		当这颗小行星 2012 年再次接近月球和地球时	As this asteroid was due to approach the Moon and Earth again in 2012,
13:27		人们想通过嫦娥二号拜访这个天体	Chang'e 2 was to pay it a visit.
13:34		该天体于 1989 年被发现	Toutatis was discovered in 1989
13:38		体积约为 4.5 乘以 2.5 公里	and has a size of 4.5 by 2.5 kilometers.
13:40		它是一颗危险的小行星	It is considered one of the most dangerous asteroids,
13:43		因为它每四年接近地球一次	because it approaches Earth every four years
13:45		并在其轨道上受到地球引力的强烈影响	and its orbit is strongly influenced by Earth’s gravitational pull.
13:50	Wu Weiren (Mann 3) 吴伟仁 （男丙）	要和 4179 小行星	To plan and carry out a rendezvous
13:52		要探测 要交会	with Asteroid 4179,
13:54		两个最重要的工作要做	two important tasks needed to be carried out.
13:57		第一个是要精确地	The first was to accurately analyse its data,
13:58		知道它的轨道数据	
14:00		第二还要精确地设定 是吧	and the second was to calculate and control
14:02		设置或者控制我们嫦娥二号的轨道	the trajectory of Chang’e 2 precisely.
14:06	Prof Walter 瓦尔特教授	这不仅仅是穿越小行星的轨道	They not only had to cross the asteroids trajectory,
14:10		更是要精准把握靠近时机	but also found the right time to get close to it.
14:13		这一任务难度超乎想象	The task is almost beyond the imagination.
14:15		嫦娥二号也随之出现	Chang’e 2 would need to approach exactly
14:17		小行星出现时	as the Asteroid occurs,
14:18		因为二者相距达到数百万公里	Since it’s flying in the depth of space
14:21		就像太空深处飞行的行星	and is millions of kilometers away,
14:24		我们在地面上肉眼看不见它们	you can only see what happens with a

		只能借助望远镜观测	telescope on Earth.
14:27		这是一项充满成就感的挑战	And that’s quite a challenging achievement.
14:32	Narrator 解说	在小行星速度为 16.7 公里/秒	The asteroid has a speed of almost 16.7 kilometers per second,
14:38		探测器速度为 10.7 公里/秒的情况下	and the probe a speed of 10.7 kilometers per second.
14:43		这样的行动类似于	This task would be the equivalent of trying to
		用子弹击中飞行中的另一颗子弹	hit one flying bullet… with another.
14:47		2012 年 12 月 13 日	On December 13, 2012,
14:50		探测器成功进入小行星的轨道	the probe succeedes in entering the trajectory of the asteroid.
14:54		图塔蒂斯和嫦娥二号之间的距离仅为 870 米	Toutatis and Chang'e 2 met at a distance of only 870 meters.
15:04		探测器的精度超乎想象	With unimaginable precision:
15:07		如果探测器在天体运行轨道上只早 0.3 秒	Should the probe enter the trajectory of the asteroid 0.3 seconds too soon,
15:12		就会被小行星撞成宇宙中的尘埃	it would have hit the ground and become cosmic dust.
15:16		在 55 秒的时间里	For 55 seconds
15:18		探测器拍下了图塔蒂斯的照片	the probe took pictures of Toutatis.
15:21		这是第一张 也可能是最新的一张	They were the first and as of today the only photos
15:24		从这个距离拍摄的如此高质量的照片	from this proximity and of this quality.
15:29		图塔蒂斯未来会对地球构成威胁吗	The question remains: Will Toutatis ever be a danger to Earth?
15:33	Prof Walter 瓦尔特教授	目前我们知道图塔蒂斯不会产生撞击	We already know that it will pass Earth.
15:36		它会与地球擦肩而过	It will come very close,
15:39		图塔蒂斯不会对地球构成威胁	but it will certainly not hit Earth.
15:40		但宇宙里有成千上万的小行星	But in space there are thousands or even hundreds of thousands of asteroids,
15:45		它们将会使地球陷入危险	that could become a serious danger to Earth in the distant future.
15:50	Narrator 解说	此后 中国的太空探测器开始了星际之旅	After rendezvousing with Toutatis, the Chinese space probe continued its journey into interstellar space.
15:58		2014 年 她已经远离地球 7 千万公里	In 2014, it was already 7 million kilometers away from Earth.
16:02		然后 无线电连接中断了	Then… radio contact was lost.

16:05		短短一年后	Only one year after this mission,
16:08		2013 年 12 月 1 日 长征 3 号乙运载火箭	on December 1, 2013, the "Long March 3B" missile was launched.
16:13		将第三颗探测器嫦娥三号送入地球轨道	On board it had a third probe: Chang’e 3.
16:22		发射 20 分钟后	20 minutes after launch,
16:23		探测器与火箭分离	the probe separated from the rocket
16:26		朝着月球加速	and accelerated towards the Moon.
16:34		这一次 探测器计划登陆月球进行探测	This time, the probe was supposed to land on the Moon to carry out investigations and measurements.
16:41		5 天后 嫦娥三号进入月球轨道	5 days later Chang'e 3 entered the lunar orbit.
16:48		嫦娥三号以距月 100 公里的距离绕月运行七天之后	After circling the Moon for a week at a height of 100 kilometres,
16:54		于 2013 年 12 月 14 日开始着陆演习	Chang’e 3 initiated a landing maneuver on December 14, 2013.
17:01		在距月球表面 15 公里的高空	15 kilometers above the lunar surface,
17:03		由制动系统发起着陆	the landing was triggered by a braking maneuver.
17:26	Luan Enjie (Mann 2) 栾恩杰 （男乙）	阿波罗第一次登月的时候	When the Apollo spacecraft first landed on the Moon,
17:28		他们的悬停点并不是他设计点	it couldn’t find a suitable place to land.
17:33		就是他这个（阿波罗）飞船	Where the Moon lander touched down
17:35		到了位置以后看底下	was found to be very uneven
17:36		是很不平的	
17:37		如果这样落下去	where it could easily
17:39		它可能会折跟头	have toppled over.
17:41	Wu Weiren (Mann 3) 吴伟仁 （男丙）	这个悬停非常重要	Chang’e 3 had to hover over the surface of the Moon
17:42		悬停是找着陆点	until it could find a suitable landing site.
17:44		我们要求下去过后	Crevices in the surface had to be no more than 20 cm wide
17:46		不能超过 20 厘米的沟渠	in the area where the spacecraft landed.
17:49		同时我们也不要出现	It couldn’t slope
17:51		8 度以上的坡度	by more than 8 degrees.
17:53		就是尽量平坦一点儿	The surface had to be as even as possible.
17:54		所以这个选择都是着陆凭自己	So, it was down to
17:57		自主控制 自主选择	the lander’s own control and independent choice.
17:59	Kontrollzentr	GNC 转悬停模式	GNC starts hovering mode,

	um Mann (Mann 2) 控制中心男工作人员（男乙）		
18:02	Mann Kontrollzentrum (Mann 5) 地面人工控制中心（男戊）	GNC 转悬停模式	GNC starts hovering mode.
18:08	Narrator 解说	探测器下降到大约 3 米高度	The probe dropped to about three meters,
18:11		然后关闭引擎	then the engine cut off…
18:13		探测器轻轻降落在月球表面	and the probe landed softly on the lunar surface.
18:23		2013 年 12 月 14 日下午 1 时 11 分	On December 14, 2013, at 1.11 pm UTC,
18:29		中国的航天器首次在外星着陆	the People's Republic of China landed its first spacecraft on an extraterrestrial body.
18:50		着陆 10 分钟后	Ten minutes after landing
		探测器展开了太阳能电池板	the probe opened its solar panels,
18:55		望远镜和发射杆	telescope and aerials.
18:57		探测器重约 1.2 吨	It had a weight of 1.2 tons.
19:02		嫦娥三号已准备就绪	Chang'e 3 prepared to get to work.
19:21		桅杆上的照相机在着陆后	Immediately after landing,
		立即对周围环境拍摄了一张 360 度的照片	cameras on the pole took a 360-degree picture of its surroundings.
19:27		毕竟 人们想看看落月点的实景	Chinese engineers wanted to know exactly where the probe had landed.
19:33		控制中心迅速将这些图像做成 3D 全景图	The control center assembled the images as a 3D panoramic picture.
19:44		着陆 6 小时后	Six hours after landing,
		玉兔现身了	The rover "Jade Rabbit" made its first appearance.
19:50		这是中国第一个在外星开展巡视勘察的机器人	It is China's first robot to examine an extraterrestrial body.
19:56		它的独特构能使其爬上 20 度的斜坡	It has been built in such a way that it can climb gradients of more than 20 degrees
20:01		并跨越 20 厘米高的障碍物	and overcome obstacles of a height of 20 centimeters.
20:07		机器人通过一个装载平台离开探测器	The robot exited the probe via a ramp,
20:10		被轻轻地放置在月球沙地	which was placed gently onto the sandy surface of the Moon.

20:21		这个机器人高 1.5 米	The robot has a height of one and a half meter,
20:24		重 140 公斤	a weight of 140 kilograms,
20:25		可以载重 20 公斤	and could carry a payload of 20 kilograms.
20:29		月球车安装了摄像头和用于检测土壤样本的仪器	It is equipped with cameras and measuring instruments to examine soil samples.
20:35		它还有一条机械臂	In addition, it has a robotic arm.
20:40		玉兔号计划在三月内探索 3 平方公里的区域	Within three months, Jade Rabbit would explore an area of three square kilometers.
20:52		由于月球上的一个昼夜相当于地球上的 28 天	Since one lunar day corresponds to about 28 earth days,
20:56		机器人和母船会连续两周暴露在明亮的阳光下	the robot and the mother ship are in full sunlight for two weeks
21:02		然后连续两周处于完全黑暗的环境中	and for another two weeks in total darkness.
21:05		白昼气温高达 130 度	During the day the temperatures rise up to 130 degrees Celsius,
21:10		夜晚气温下降到零下 160 度	at night they drop to minus 160 degrees Celsius.
21:14		环境极为恶劣	It is a very inhospitable climate.
21:16		为了抵御极端温度	In order to enable them to withstand these extreme temperatures,
21:19		玉兔号和嫦娥三号探测器	Jade Rabbit and Chang’e 3 are equipped
		都配备了供暖系统和智能技术	with heating systems and intelligent technology.
21:25		当月夜来临 所有的系统都被降下收回	When the lunar night arrives, Jade Rabbit and Chang’e 3 shut down all systems,
21:30		就像生物一样	And just like living beings,
21:33		玉兔和嫦娥三号在月球上休眠了	fall into lunar sleep.
21:41		此时 中国控制中心的人们	At the time, no one in China's control center
21:45		还不知道一场灾难即将来临	could have foreseen the severe setback that was about to come.
21:51		地球两星期后	Two earth weeks later,
21:53		第二个月昼开始了	the second lunar day starts
21:55		玉兔苏醒过来	and Jade Rabbit woke up again.
22:03		机器人开始用 X 射线光谱仪研究月球土壤	Using an X-ray spectrometer, the robot began to examine the lunar soil.
22:09		结果发现	It turned out that

22:10		土壤成分与阿波罗宇航员带回地球的岩石部分相同	the composition is partly the same, but mostly very different from the rocks
22:14		大部分完全不同	that the Apollo astronauts brought back to The Earth.
22:21		在行进时	While moving,
22:22		它的地面雷达探测到了 140 米深的地面	its ground radar examined the ground to a depth of 140 meters.
22:35		到达目的地后	The tallest rock formations at its destination
22:39		我们看到大约 10 米左右的岩层	are about five by two meters.
22:45		玉兔的照片显示	Jade Rabbit's pictures show that
22:48		地面上分布着很多岩石	there are many rocks on the ground
		可能会给月球车带来麻烦	that could be hazardous to the rover.
23:21		为了让中国人民了解探月之旅	In order to bring the lunar expedition closer to the people in China,
23:24		研究人员在中国最大的社交网络微博上	the researchers had set up a chat account for Jade Rabbit
23:29		为玉兔建立了一个帐号	in the largest Chinese social network WEIBO.
23:31		在第二个月夜来临之前	But just before its second moon night,
23:33		它却宣布	it reported:
23:34	Cartoon Stimme (Mann 5) 卡通音（男戊）	啊 我坏掉了	"ah … I'm broken ..." Regarding the matter
23:44	Sun Zezhou (Mann 4) 孙泽州（男丁）	嫦娥三号 玉兔在月球上	Jade Rabbit was on the Moon
23:48		出现了问题	and something had gone wrong.
23:49		导致机构不能够再进行受控运动了	One of the control units had failed, and it couldn’t move anymore.
23:54	Narrator 解说	即便这样 机器人仍从其固定位置	Up until July 31, 2016,
23:59		收集有价值的数据并将其发送到地球	the rover was still able to collect valuable data from its fixed position
		2016 年 7 月 31 日之后	and send it to Earth.
24:05		它完全停止了运行	But then it completely ceased operation.
24:15	Zhang Yuhua (Female) 张玉花（女）	确实 我们在故障复现的时候才发现	It took a while to work out what had gone wrong.
24:19		就是在追溯前面的照片	Looking at the pictures it had already sent
24:21		有在月面留下比较深的车辙	You could see deep tracks in the lunar surface.
24:26		这个过程当中也能够看到石块	In addition, there were large stones dotted about.
24:30		有可能在深的车辙	We thought that Jade Rabbit might have

24:32		和石块过程当中把电缆就钩到了	Got its cables entangled moving over the stones.
24:36	Prof Walter 瓦尔特教授	这是一件好事	Very few understand
24:38		很少人能认识这一点	that that was actually good.
24:40		我们总是遭受一些失败后	Things have to go wrong
		才了解我们的具体不足之处	so people can learn where there are still problems.
24:44		这也是本次任务的目的	In fact, that was one of the objectives of the mission.
24:46		问题会不断出现	If something goes wrong,
24:48		经历失败的考验	then we can
		我们会明白	learn from it,
24:50		在下一个任务中如何改进	and do better the next time.
24:53		对于中国来说 塞翁失马 焉知非福	That's why things couldn't have gone better for the Chinese.
24:57	Sun Zezhou (Mann 4) 孙泽州（男丁）	这些电缆出线口 进线口	The Moon rover had a lot of cable connections.
25:00		感觉是这些电缆出现了松脱	Maybe one of these cables came loose.
25:04		运动之后再机械磨损	Maybe it suffered mechanical wear and tear as it moved
25:06		最终可能导致了	causing this to happen.
25:08		某一个供电路的短路	Anyway there was a short circuit.
25:13	Narrator 解说	然而 玉兔创造了一项新纪录	Nevertheless, Jade Rabbit set a new record:
25:19		从没有一辆月球车	No lunar rover had ever succeded in
25:21		能在这种恶劣环境中生存 31 个月	surviving 31 months in such a hostile environment.
25:25		最初计划只是三个月	Only three were planned.
25:30		这颗探测器今天仍然在月球上活跃着	Today, the probe is still active on the Moon.
25:33		直到 2040 年	It will continue to
		它都将继续向地球发送数据	send data back to Earth until the year 2040.
25:38		研究人员已经达成目标	Chinese researchers have
25:39		中国在测试重要关键技术方面取得了成功	succeeded in testing important key technologies.
25:43		并首次对月球地壳下几百米深度进行了雷达测量	And for the first time they had carried out a radar measurement of the Moon's crust up to several hundred meters deep.
25:51		中国已经准备好了下一步行动	China was now ready for the next step.
25:54		这次 探测器将在月球背面着陆	This time, a probe would land on the dark side of the Moon.
25:59		这是一个技术上异常困难的项目	From a technical standpoint,
26:03		迄今为止还没有人成功达成	It was an extraordinarily difficult project

			that no one had yet succeeded in accomplishing.
26:07		在中国西部西昌航天基地的实验室里	At the Xi’chang Satellite Launch Center,
26:09		专家们正在潜心研究嫦娥四号	engineers were working on Chang'e 3's successor -- Chang’e 4.
26:12		现在是 2018 年 12 月	It is December 2018,
26:15		距离上次任务开始已经五年了	five years after the start of the last mission.
26:19		但嫦娥四号的技术	Chang'e 4's technologies
		将根据经验和新的任务进行调整和改进	Had been finely tuned for the new mission.
26:23		嫦娥三号和玉兔一号的经验非常重要	The lessons learned from Chang’e 3 and Jade Rabbit 1 were crucial.
26:28		这次还将搭载来自德国 瑞典 荷兰	This time the Chinese engineers also used technology
		和沙特阿拉伯的合作载荷	from Germany, Sweden, The Netherlands and Saudi Arabia.
26:34	Prof Walter 瓦尔特教授	我们已在航天领域与中国进行合作	We had already collaborated with the Chinese in the matter of space travel.
26:37		合作过程非常愉快	It always runs smoothly.
26:39		中国科学家确切知道他们的需求目标	However, the Chinese know very well what they want
		美国也是如此	and kind of resemble the Americans.
26:46		他们都要独立完成最重要的工作	They do the important things on their own.
26:49		我对此深表理解	And I kind of understand that, too.
26:52	Sun Zezhou (Mann 4) 孙泽州（男丁）	第一 我们在系统设计上	Firstly, after we had a better understanding
26:54		对于这样一个新的认识提高之后	of the system design,
26:58		增加了各种走线的布局以及防护措施	the layout of various routes and protective measures had been added
27:02			
27:04		让这种可能出现的短路不发生	to avoid the possibility of cut-outs.
27:08		第二个方法	The second step
27:09		在系统上做好系统的故障隔离的设计	was to design a fault isolation process for the system.
27:14		就相当于当一个局部出现问题的时候	This helps stop a local problem
27:17		不让这个问题进一步扩展	from expanding into other parts of the system.
27:11		我们眼前的嫦娥四号探测器将永远离开地球	The Chang'e-4 probe would leave Earth forever
27:14			
27:16		登陆到一个陌生的世界	and land on a strange world.
27:20	Narrator 解说	月球的正面和背面究竟有何不同呢	So, what exactly is the difference between the side of the Moon facing Earth… and the dark side?

27:26	Prof Walter 瓦尔特教授	主要区别在于	The biggest difference
27:27		人们不能看道月球的背面	is that we can never see the far side of the Moon
27:29		我们看到的总是月球正面	we only ever see the front of the Moon.
27:32		这是我们太阳系的一个特点	The Moon has a characteristic that is unique in our solar system.
27:35		月球绕地球公转的速度	It spins around Earth just as fast as
27:38		和自传速度相等	it does around its own axis.
27:40		所以我们只能看到月球正面	That is why we always face the same side of it.
27:42		数百万年来 人们从来未看到月球背面	Mankind has not seen the dark side of the Moon for millions of years.
27:45		近年来 我们才揭开月球背面的面纱	Only in recent times have we lifted the veil on the back of the Moon.
27:50	Narrator 解说	所谓的月球背面并不是真正的暗淡无光	The side known as the dark side of the Moon, isn't really dark,
27:56		而是每两周被太阳照射一次	but is illuminated every two weeks by the sun.
28:00		在太空探索史上	No nation has yet dared to
		从未有国家敢于	send a probe
28:04		前往神秘的月球背面	to this mysterious part of the Moon.
28:07		这在技术上太过复杂	Such a landing is not only technically difficult,
28:09		而且着陆十分危险	but also very dangerous.
28:12		月球背面的最高山峰高达 10629 米	The highest mountain on the dark side rises to more than 10,629 meters,
28:18		比珠穆朗玛峰高出近两公里	almost 2,000 meters higher than Mount Everest.
28:21		最深的山谷也深达 9178 米	Its deepest valley is just over 9178 meters deep.
28:27		与我们能看到的月球正面截然不同的是	On the dark side are mainly plateaus,
		月球背面高原遍布	but also mountains and
		还有诸多山脉和深深的陨石坑	deep craters
28:33		原因在于小行星	created by asteroids.
28:42		即使是小到几公斤重的陨石	Even small meteorites with a weight of a few kilograms
28:46		也能导致上百米大的陨石坑	can create craters well over 100 meters deep.
28:53		在我们从地球上看到的月球正面	On the side of the Moon that faces Earth,
28:56		有超过 **30 万**个直径约 1 公里的陨石坑	there are more than 300,000 craters with a diameter of over about a kilometer.
29:02		因为缺少大气层 月球上无风无	In the absence of an atmosphere, there are

		雨	no weather conditions on the Moon.
29:08		历经数千年 数百万年或者数十亿年	Therefore, all traces on the lunar surface remain for millions or even billions of years…
29:13		月球表面的所有痕迹都保留着其产生时的原样	as pristine as the day they were created.
29:17		月球上已知的最大陨石坑	The largest known crater on the Moon
		是背面的南极艾特肯盆地	is the South Pole-Aitken basin on its dark side.
29:23		直径约为 2500 公里	It has a diameter of over 2,500 kilometers,
29:28		面积有中国的一半大	which corresponds to an area half the size of China.
29:32		正是在这个神奇的陨石坑中	And it is in this giant crater
29:34		嫦娥四号探测器即将开启它的使命	that Chang'e 4 began its mission.
29:44	Ouyang Ziyan (Mann 4) 欧阳自远（男丁）	月球是 45 亿年以前诞生	The Moon came into being about four and a half billion years ago.
29:48		大概从月球正面	In the side of the Moon that faces Earth,
29:49		我们能获得最多的是 40 亿年以来	we can see four billion years into the Moon’s past,
29:55		包括这些海洋盆地的形成	including the formation of the sea basins,
29:58		包括那些斜长岩的古老岩石	the ancient rocks of plagioclase, and more,
30:02		但是我们还缺了一段	but we are still missing one period of time.
30:05		40 亿年以前到月球形成的时候	What about the 4 billion years back from when the Moon was born?
30:10		那么我就期望能够找到	I hope to find rocks old enough
30:12		更古老的那些岩石	to provide the answer.
30:15		刚好月球背面有一个巨大的撞击坑	It just so happens that there is a huge crater on the far side of the Moon,
30:20		是 40 亿年以前撞的	formed four billion years ago.
30:23	Narrator 解说	在西昌卫星发射中心	Back at the space center in Xichang.
30:26		距离向月球背面发射嫦娥四号仅剩几天时间	In a few days, Chang'e 4 will set off for the dark side of the Moon.
30:34	Wu Weiren (Mann 3) 吴伟仁 （男丙）	对未知的世界保持探索的欲望	The desire to explore the unknown
30:39		这是我们人类的天性	Is an intrinsic part of human nature.
30:41		在确定嫦娥四号何去何从的时候	When deciding where the Chang'e-4 should be sent,
30:44		我们觉得到月球背面去	we thought it should go to the far side of the Moon,
30:47		开创一下人类的第一次	for the first time in human history.
30:50		至于着陆呢	Regarding landing,
30:51		在月球正面	the side of the Moon that faces Earth is equivalent to

30:52		相当于华北平原这一带	landing on the North China Plain,
30:54		相对平坦	which is relatively flat.
30:55		但是要在月球背面着陆	But landing on the dark side of the Moon
30:57		就有点儿类似于	is similar to
30:59		像我们国家云贵川这种丘陵地带	a hilly or mountainous area in the Chinese provinces of
31:02		或大山地带	Yunnan, Guizhou, or Sichuan.
30:03		当然难度就大多了	That was certainly much more difficult.
30:04	Zhang He (Female) 张熇（女）	当时有专家表示过	Some colleagues at that time said:
31:07		月球背面	no other nation has ever landed there –
31:07		其它国家都没有做到	No other country has ever landed on the far side of the Moon.
31:09		咱们是不是能做到	And you want to be the first ones to do it?
31:11		从我内心 我一直相信	I always believed in
31:13		我们嫦娥三号的探测器	the design improvements
31:15		经过一定完善设计	we made to the Chang'e-3,
31:17		增加一颗中继星	and by adding a relay satellite,
31:18		我们可以做到人类首次月球背面的着陆	we could land on the far side of the Moon for the first time.
31:22	Prof Walter 瓦尔特教授	因为要求过于苛刻	No one ever tried that before,
		人类从未做过尝试	because it is very difficult.
31:25		这不仅涉及到巡视器降落和起飞	It is not only necessary to land a rover,
31:29		而且图像信号必须通过中继卫星传输到地球	but as well to transmit an image signal to Earth via a relay satellite.
31:34		技术难度非常大	That is really demanding.
31:36	Narrator 解说	为了确保传输成功	To ensure the successful transmission,
31:39		鹊桥通讯卫星在 7 个月前首先踏上征程	the communications satellite "Queqiao" was launched seven months earlier.
31:45		鹊桥是传说中喜鹊搭成的桥	In English, "Queqiao" means "Magpie Bridge" and recalls a Chinese legend.
31:55		经过 20 天的航行	20 days later,
31:57		鹊桥抵达了距离月球约 6.5 万公里的预定位置	"Magpie Bridge" arrived in its planned position, just over 65,000 kilometers from the Moon.
32:04		它已经完成了 40 万公里的里程	It had travelled over 400,000 kilometers.
32:28		鹊桥类似于一面镜子	Similar to a mirror,
32:31		将月球背面探测器的无线电信号反射回地球	the satellite was supposed to transfer radio signals from the probe on the dark side of the Moon back to Earth.
32:41		2018 年 11 月 10 日	November 10, 2018,
32:44		中国西部西昌卫星发射中心	Xi’chang Satellite Launch Center, Western China.
32:47		工程技术人员做好“长征三号乙”	Technicians and engineers were preparing a

		火箭的发射准备	"Long March 3 B" rocket for deployment.
32:54		这是他们的日常工作	It was a routine task.
32:57		这种大功率火箭长 52 米	These powerful rockets are 52 meters long,
33:01		起飞重量 241 吨 直径约 3 米	have a take-off weight of 241 tons and a diameter of just almost three meters.
33:08		在距离地球表面 200 公里的高度	They can carry up to 7.2 tons of payload
		这种火箭的载荷高达 7.2 吨	up to a height of over 200 kilometers above Earth's surface.
33:15		这次发射会成功吗	Would this launch succeed as well?
33:23	Chen Huaqiang (Mann 5) 陈华强（男戊）	我们航天人有一句老话叫	We astronauts have a saying:
33:25		一次成功不等于次次成功	Success once, doesn't mean you'll succeed again.
33:27		成功不等于成熟	Success is not equal to maturity,
33:29		成熟不等于可靠	and maturity is not equal to reliability.
33:31		成功就是差一点失败	Success is so close to failure,
33:33		失败就是差一点成功	and failure is almost success.
33:37	Narrator 解说	在西方准备欢庆圣诞节之际	On December 8, 2018, as the western world prepare for Christmas,
33:41		中国在 2018 年 12 月 8 日悄然开启	China starts without delay on one of its biggest space missions
33:46		自 50 年前登陆月球以来最大的太空探险之一	since the American moon landing fifty years before.
34:07		在人类历史上	For the first time in the history,
34:09		人类科技首次登陆月球背面	human technology will land on the dark side of the Moon
34:13		开始发现和探索之旅	to make new discoveries.
34:22		发射 19 分钟后	19 minutes after the launch,
34:23		探测器与火箭分离	the probe separates from the rocket
34:26		开启了它的月球之旅	and begins its journey to the Moon.
34:39		在距离月球表面 129 公里处	At a distance of 129 kilometers from the lunar surface,
34:42		发动机被点燃 同时启动制动过程	engines are ignited and the braking process has begun.
34:53		在 2019 年 1 月 3 日清晨	On the morning of January 3, 2019,
34:56		探测器最终抵达月球背面	the probe finally reached its position
		俯视巨大的南极艾特肯盆地	above the South Pole-Aitken basin at the dark side of the Moon.
35:05		位于北京的控制中心一片紧张	At the conrol center in Beijing, tensions were running high.
35:09		探测器最终能成功着陆吗	Will the probe landing succeed?

35:14		作为计划着陆点的撞击坑	The small crater, in which it is supposed to land,
35:17		由万米高的山脉所层层环绕	is surrounded by mountains over 10 kilometers high.
35:20		着陆点非常狭窄	The landing site is so narrow
35:23		探测器必须垂直着陆	that the probe has to be landed vertically.
35:25		这是极具风险的操作	It is a very risky maneuver.
35:31		20 公里的距离在 10 分钟时间内	Within ten minutes and a distance of 20 kilometers,
35:35		探测器必须将时速从 6120 公里降至零	the speed of 6,120 kilometers per hour has to be slowed down to zero.
35:42		在距离月面约 30 米的地方	30 meters above the surface,
		探测器切换到悬浮模式	the probe switches to hover mode
35:47		自主寻找一块平坦 适合的着陆点	to independently seek out a suitable landing site.
35:56	**Kontrollzentrum Mann (Mann 2)** 控制中心男工作人员 **(男乙)**	降落相机开机	Landing camera on.
35:58	**Kontrollzentrum Mann 2 (Mann 5)** 控制中心男工作人员 2 （男戊）	降落相机开机	Landing camera on.
36:11	Narrator 解说	在世界协调时间 2 点 23 分	At 2:23 am UTC,
36:13		第一批照片终于出现在了墙上的监测屏	the first images reach the control center.
36:16		这是月球背面的第一批照片	They are the first pictures of the dark side of the Moon.
36:20		但探测器仍未着陆	But the probe has yet to land.
36:23		它悬停在距离月面约 **30 米**处 寻找最佳的着陆点	It is hovering about 30 meters above the surface.
36:26		通过中继星“鹊桥”的无线电通讯保持稳定	Radio connection with the communications satellite "Magpie Bridge" is stable.
36:32	Kontrollzentrum Frau (Female) 控制中心女工作人员 （女）	长城报告	Great Wall Report:
36:33		转接近下降模式	Close to descent mode .

36:36	Kontrollzentrum Mann (Mann 2) 控制中心男工作人员（男乙）	GNC 转接近下降模式	GNC close to descent mode.
36:51	Kontrollzentrum Frau (Female) 控制中心女工作人员	长城报告	Great Wall Report:
36:52		转悬停模式	Start hovering mode.
36:34	**Kontrollzentrum Mann (Mann 2)** 控制中心男工作人员 **（男乙）**	GNC 转悬停模式	GNC starts hovering mode.
37:30	**Kontrollzentrum Frau (Female)** 控制中心女工作人员（女）	长城报告	Great Wall Report:
37:31		转避障模式	Start obstacle avoidance mode.
37:33	**Kontrollzentrum Mann (Mann 2)** 控制中心男工作人员 **（男乙）**	GNC 转避障模式	GNC starts obstacle avoidance mode.
37:55	Kontrollzentrum Mann (Mann 5) 控制中心男工作人员（男戊）	请长城确认	Great Wall,
37:56		探测器着陆情况	please confirm landing of the probe.
37:58	Great Wall Frau (Female) 长城女工作人员（女）	长城报告	Great Wall Report:
37:59		着陆器正常着陆	Positive, the probe has landed.
38:04	Narrator 解说	一切万无一失	There is great relief.
38:06		探测器于世界协调时 3 点 26 分成功着陆	It is 3:26 am UTC that the probe has successfully landed..
38:11		中国书写了人类历史	China has made history.
38:15		在西方未广泛关注的情况下	Almost unnoticed by the western world,

38:17		中国探测器第一次在月球背面轻盈着陆	a probe is landed for the first time on the dark side of the Moon.
38:21		探测器伸缩臂上的照相机在上午11时40分	At 11:40 am UTC the telescope pole of the probe
		拍摄到了第一批照片	sends the first pictures.
38.37		着陆点与预计地点精准无误	And the probe has landed exactly where it was intended to:
38:41		冯·卡门坑是一个直径187公里的撞击坑	in the Von Karman Crater, 187 kilometers across.
38:55		10小时后	Ten hours later,
		通过转移机构的梯子	a ramp is extended
38:59		机器人玉兔二号	and the robot Jade Rabbit 2 leaves the first human traces
		在月球背面的大地上留下了首个人类印记	in the surface of the dark side of the Moon.
39:14		因为在月球上无风无雨	Since there are no weather conditions on the Moon,
39:18		就像尼尔·阿姆斯特朗留下的脚印	its tracks will be visible for eternity
39:22		这些痕迹将得到永久保留	as is the footprint left by Neil Armstrong during his first moonwalk in 1969.
39:44		从第一批照片中研究人员可以看出	In the first pictures, researchers could see that
39:47		着陆点处于一个小斜坡上	Chang’e 4 had landed on a slight incline.
39:51		嫦娥四号探测器目前位于一个小环形山	Chang'e 4 is now in a small crater
39:55		而这个小环形山又位于太阳系最大的环形山之中	which lies in the largest known crater caused
40:00		这是由陨石的撞击所形成	by a meteor impact in our solar system: the South Pole-Aitken basin.
40:02		研究人员希望在此找到超过40亿年历史的岩石	There, researchers hope to find rock samples older than 4 billion years.
40:09		南极艾特肯盆地正是40亿年前	The South Pole Aitken Basin was created in this period
40:12		由一颗巨大的小行星撞击而形成	by the impact of a gigantic asteroid.
40:20		在本次行程中	But that is not the only important task
40:21		研究人员还交给嫦娥四号和玉兔巡视器	that Chang’e 4 and Jade Rabbit 2 have
		一些重要任务	to carry out.
40:28		人类从未在月球背面上测量过常规温度	The temperatures on the far side of the Moon have not been regularly measured before.
40:33		月球的日间有多热	How high do they rise on a moon day,
40:35		夜间有多冷呢	and how low do they drop at night?

40:40		月球没有大气层	Since the Moon has no atmosphere,
40:41		也就没有像地球的大气温度	there is no air temperature like that of Earth.
40:45		因此必须对月球地面的温度进行测量	Therefore, the temperature of the Moon sand must be measured.
40:50	Zhang He (Female) 张熇（女）	是在我们这个释放巡视器的	When the rover is released,
40:53		大家可能知道有一个叫转移机构	it has to be transferred down to the surface.
40:55		那个转移机构梯子	This transfer uses a ramp
40:56		最终是要搭在月壤上的	that rests on the lunar soil.
40:58		那我们在转移机构的根部	We built these low temperature thermometers
41:01		来配置这些测低温的热敏电阻	Into the base of the ramp.
41:03		巡视器车开走以后	As the rover moved down,
41:05		这个机构会和月壤能够充分接触	it made contact with the lunar soil
41:07		测到月壤本身的这个温度	and was able to measure the temperature of the lunar soil.
41:09		包括我们足垫上	In addition, the four-legged footpad
41:11		四条腿足垫上	is also equipped with.
41:12		也增加了测温的装置	temperature measuring devices.
41:17	Narrator 解说	这是一个十分复杂的系统	This is a highly sophisticated system
41:21		用于实时测量温度	to measure the temperature in real time.
41:23		这些数据以及探测器的所有信息	All the information gathered by the probe
41:27		将通过通信卫星不断发回地球	is constantly sent to Earth via the communications satellite.
41:30		测量结果表明	During the night,
41:32		月球夜间的温度甚至会降至零下 190 度	temperatures drop to minus 190 degrees Celsius.
41:40		与上一代一样	Like their predecessors,
41:42		嫦娥四号和它的巡视器将在月球的日间	Chang'e 4 and Jade Rabbit 2 are supposed to work during the lunar day
41:46		也就是 14 个地球日工作	– corresponding to 14 earth days
41:48		然后在月球夜间	- then fall asleep
41:51		也就是另外 14 个地球日	during the lunar night
41:53		进入月球睡眠时间	- another 14 earth days.
42:10		探测器的另一项任务是聆听宇宙深处的声音	Another task of the probe is to listen into deep space
42:15		接收来自其他行星及遥远星系的信号	and to receive signals from other planets and distant galaxies.
42:31	Yan Yihua (Mann 2) 颜毅华（男乙）	所以我们对于这些宇宙中的更低的频率的信号	In order to be able to receive those low frequency signals,
42:36		我们就只能到外太空来进行观测	we have to go into space.
42:39	Narrator 解说	地球就像一个对着太空咆哮的扬声器	Earth is like a booming loudspeaker into space.

42:44		我们不仅在地面产生无限量的噪音	Not only on the ground do we generate ever increasing amounts of noise.
42:46		还有数以千计的卫星环绕着地球运行	In addition, thousands of satellites circle Earth.
42:51	Chen Xuelei (Mann 3) 陈学雷 （男丙）	那么这个时候正好咱们这个月球	The dark side of the Moon
42:53		就提供了一个非常好的一种环境	provides us with a perfect environment.
42:56		它可以挡住来自地球的电磁波	The Moon itself blocks all radiation from Earth.
42:58		你如果绕到月球的背面	By going to the far side of the Moon
43:00		就像咱们这次嫦娥四这样	like the Chang'e-4 probe,
43:02		那你就可以用月球本身	we can use the Moon itself
43:05		挡住地球的干扰	to block interference from Earth.
43:06		然后就可以安静地接收	Then we can quietly receive
43:09		这些宇宙的电磁波了	these cosmic electromagnetic waves.
43:14	Narrator 解说	或许从这里我们能成功获悉更多	Perhaps this way we'll be able to learn more
43:17		与宇宙起源和形成相关的信息	about the origin of our universe
43:20		甚至能与外部世界建立联系	or perhaps make contact with alien worlds.
43:31		研究人员还为月球车配备了	In addition, researchers have equipped the rover
43:34		一个红外测量装置和一台红外照相机	with an infrared measuring device and infrared camera
43:39		从而更好地测量土壤特性	in order to better explore the nature of the soil.
43:53	Prof Walter 瓦尔特教授	他们对土壤进行了采样	They were able to prove
43:55		结果表明	that the composition of the samples
		月球正面和背面的土壤成分 风化层相同	is identical to the soil of the side of the Moon that faces us,
44:03		并与地球保持一致	and as well to the soil of Earth, also known as regolith.
44:05		这进一步说明月球起源于地球	That is further evidence that the Moon was once part of Earth.
44:15	Narrator 解说	玉兔二号月球车会确定地下	Jade Rabbit 2 is also supposed to learn
44:19		是否有可供未来开采的矿石	whether ores exist in the soil that could possibly be mined in the future.
44:25	Li Chunlai (Mann - Matthias!) 李春来	地面应用系统贯穿了	The ground monitoring system covers
44:27		就包含了整个科学的链条	a large area of scientific fields.
44:31		嫦娥四号的数据实际上	The data from Chang'e-4
44:33		我们会在最早的时间	was provided to domestic scientists
44:36		就提供给国内的科学家去用	as quickly as possible,
44:39		甚至给全世界的科学家来公开使用	so that scientists worldwide could begin studying it,
44:42		产出更多的科学成果	paving the way for more scientific

			achievements.
44:45	Narrator 解说	除了研究月球土壤和来自太空深处的信号	But in addition to examining the lunar soil and studying signals from the depths of space,
44:49		嫦娥四号还有另外一项重要使命	there is yet another important task for Chang'e 4.
44:54		如果我们想在月球定居	In order to enable humans to colonize the Moon one day,
44:57		实现独立于地球之外的食物供给	it is also vital
		则对于生存而言至关重要	that nutrition is independently provided, independently from Earth.
45:01		动植物可以在月球上繁殖吗	So… the question is… can plants and living creatures be bred on the Moon?
45:06		重庆大学生自发组织的科普类实验活动	Students at the Chongqing University, developed an experiment
45:09-45:13		旨在激发青少年对科学领域的探索热情	which aims to stimulate teenagers' enthusiasm for scientific exploration.
45:17		人们将种子和昆虫卵放入一个容器	Seeds and insect eggs are placed in a transport box
45:19		从而了解植物和昆虫在月球上	in order to see whether plants and insects on the Moon
45:22		能否同时生长	can simultaneously come to life and develop together.
45:30		实验选择了土豆 油菜 棉花和一种芝麻菜的种子	The scientists decide to use seeds of potatoes, rapeseeds, cotton and a kind of arugula for the experiment.
45:38		此外 将酵母和果蝇卵一同装进一个小水箱中	Then they add yeast, the eggs of fruit flies, a small water tank and of course…
45:44		当然 还有土壤	Soil.
45:45		为了避免它们在失重的旅程中飞出储存罐	To prevent everything from getting mixed up on the weightless journey,
45:48		土壤和种子都用了特殊的棉质纤维网进行固定	soil and seeds are stabilized with a special cotton fleece.
45:56		一旦向储存罐中加水	As soon as water is added to the boxes,
45:59		棉网就会溶解	the cotton fleece dissolves
46:01		这样就给植物生长提供了空间	and leaves space for the plants.
46:08		探测器着陆后 开始为它们供给水	Immediately after landing, the experiment begins.
46:13		实验会成功吗	Would it be possible to grow plants
46:15		在月球上有可能繁殖动植物吗	and breed animals on the Moon?
46:18		没有人知道答案	No one knew the answer.
46:26		仅仅四天之后 奇迹出现	Four days later… the unimaginable occurs.
46:30		棉花开始生长	Cotton begins to grow,

46:33		随后昆虫孵化出来	then insects hatch.
46:34		植物产生氧气使昆虫得以生存	The plants produce oxygen, which makes it possible for the insects to survive.
46:39		微型照相机拍摄了每一步进展	The progress is filmed by a miniature camera.
47:02		1 月 13 日进入了月球的夜间	As the lunar night sets in on January 13,
47:05		储存容器里的温度降到了零下 52 度	the temperature in the box drops to minus 52 degrees Celsius.
47:11		所有生物在月球上存活 212 小时后死亡	All living beings have died 212 hours after they are brought to life on the Moon.
47:19		这些生物在封闭的容器里	These living creatures are in the sealed box
49:21		会自行分解为永久无害的物质	And will decompose into permanently harmless substances
49:24		不会对月球造成任何污染	So as not to pollute the Moon.
47:25		中国探测器嫦娥四号的任务仍在继续	The mission of the Chinese probe Chang'e 4 continues
47:30		并将在未来很长一段时间内	and will provide us
47:31		向人类展示月亮背面的全新发现	with news from the dark side of the Moon for perhaps many years.
47:37	Wu Weiren (Mann 3) 吴伟仁 （男丙）	我们在后面的四期工程中	In the following four phases of the project,
47:40		也就是准备在月球上	we hope to establishment
47:41		建立月球科考站的过程中	a scientific research station on the Moon.
47:44		我们希望能够更大范围	We hope to establish a wider range of
47:47		更深的程度	more ambitious projects.
47:50		更多的渠道来进行国际合作	together with international partners.
47:59	Prof Walter 瓦尔特教授	我们应祝贺中国取得的伟大技术成就	We can only congratulate the Chinese
48:03		实际上 这标志着人类的一大科技进步	on this technical achievement.
48:05		在国际知名学术期刊《自然》上	They have actually published an article
48:08		中国科学家发表了出色的学术论文	in one of the most important scientific magazines called “Nature“.
48:10		全球科学家们公认	Scientists are truly convinced
48:13		这是人类重要的科技进步成果	that this is an excellent result for mankind.
50.46	结尾		