



# Blog Gorana Hudeca

## Predstojeća lansiranja u Svemir (18.09.2016.)

2017.

This list is compilation of reliable and others sources, chosen by my own criteria. Last week changes are in **red**. Last change **18.Sep.2017**.

**Sep22. 0002UTC** [Soyuz-2-1B/Fregat-M](#) [Glonass-M/ 52](#)

Launch site: Плесецк ([Plesetsk](#)) Cosmodrome, Russia

**Sep22. 0538GMT** [Atlas 5 541](#) [NROL-42 Trumpet Follow On 2](#)

Launch site: [Vandenberg](#), USA

**Sep28. 0800UTC** [Atlas 5 421 \(AV075\)](#) [NROL-52 \(Quasar 21\)](#)

Launch site: [Cape Canaveral](#), USA

**Sep28. 1850UTC** [Proton-M/Briz-M](#) [AsiaSat-9](#)

Launch site: Байконур ([Baikonur](#)) Cosmodrome, Kazakhstan

**Sep29. 2151UTC** [Ariane 5 ECA \(VA239\)](#) [BSat 4a / Intelsat 37e](#)

Launch site: [Kourou](#), French Guiana

60

**Sep29.** [CZ-3B/YZ-1](#) [Beidou 3 M1& M2](#)

Launch site: [Xichang](#), China

**Oct02.** [Falcon 9 FT](#) [SES 11](#)

Launch site: [Cape Canaveral](#), USA

**Oct04. 1306UTC** [Falcon 9 FT](#) [Iridium Next Flight 3 \(x10\)](#)

Launch site: [Vandenberg](#), USA

**Oct09. 2200UTC** [H-2A \(F36\)](#) [QZS-4](#)

Launch site: [Tanegashima](#), Japan

**Oct12. 0935UTC** [Soyuz-2 1A](#) [Progress MS 7](#)

Launch site: Байконур ([Baikonur](#)) Cosmodrome, Kazakhstan

**Oct13. 1027UTC** [Rokot / Briz KM](#) [Sentinel-5 Precursor](#)

Launch site: Плесецк ([Plesetsk](#)) Cosmodrome, Russia

**Oct14.** [Falcon 9 FT](#) [KoreaSat 5A](#)

Launch site: [Cape Canaveral](#), USA

**Oct17. 2137UTC** [Minotaur-C XL](#) [SkySat 8/9/10/11/12](#)

Launch site: [Vandenberg](#), USA

Oct?? [Electron](#) [Outerspace 1](#)

Launch site: [Kaitorete Spit](#), New Zeland

?? [CZ-2D](#) ZH-1 Zengheng 1 ([ESEM experimental satellite on Electromagnetism Monitoring](#)),

Ministar-1, Fengmaniu-1

50

?? [CZ-2D](#) [VRSS-2](#) (Bolivia Remote Sensing Satellite)

Launch site: [Jiuquan](#), China



# Blog Gorana Hudeca

?? [Rokot / Briz KM](#) Geo IK 2

**Nov08.** **0100UTC** [Vega](#) (VV11) **MN35-13 (Morocco EO Sat 1)**

Launch site: [Kourou](#), French Guiana

**Nov10.** **0947UTC** **Delta II 7920-10C** [JPSS-1](#)

Launch site: [Vandenberg](#), USA

**Nov10.** [Antares 230](#) [Cygnum](#) Orb-8

Launch site: [Wallops Island, USA](#)

**Nov11.** **2100UTC** **Epsilon (Jap)** **ASNARO 2**

Launch site: [Tanegashima](#), Japan

**Nov28.** [Soyuz-2-1B/Fregat-M](#) **Meteor M-2-1, two MKA N, Ionosfera 1, Ionosfera 2**

Nov?? [Falcon 9](#) FT [Iridium Next](#) Flight 4 (x10)

Launch site: [Vandenberg](#), USA

Nov?? [PSLV](#) XL (C40) IRNSS-1I

Nov?? CZ-11 Jilin(x2), Fengtai Shaonian 02

?? [Rokot / Briz KM](#) [Gonets](#) x 3 (No 24,25,26), Blits-M

Launch site: Плесецк ([Plesetsk](#)) Cosmodrome, Russia 40

**Dec07.** **Zenit 3-SLB / DM-SLB** **AngoSat**

**Dec08.** **Pegasus-XL** **ICON (Helio EX-1)**

**Dec12.** [Ariane 5](#) ES (VA240) [Galileo-FOC](#) FM15 (Nicole), [Galileo-FOC](#) FM16 (Zofia), [Galileo-FOC](#) FM17 (Alexandre), [Galileo-FOC](#) FM18 (Irina)

Launch site: [Kourou](#), French Guiana

**Dec13.** **Delta IV-M+(5,2)** **NROL-47 (Topaz 5)**

Launch site: [Vandenberg](#), USA

**Dec16.** [Falcon 9](#) FT **Bangabandhu-1**

**Dec17.** **0721UTC** [Soyuz-2 1A](#) [Soyuz MS 7 \(S54/55\)](#)

CDR: **Шкаплеров (A. N. Shkaplerov)**, Norishige **Kanai**, Scott **D. Tingle**

**Dec22.** [Soyuz-2 1A](#) / **Fregat Kanopus V 3, Kanopus V 4**

Dec?? [CZ-2D](#) GJ-3 GaoJing-3, GJ-4 GaoJing-4

Dec?? Falcon H Demo Flight

Dec?? [Falcon 9](#) FT SES-16 30

Dec?? [GSLV](#) Mk II F8 GSAT 6A

Dec?? [Proton-M/Briz-M](#) Blagovest 12

Dec?? [Falcon 9](#) FT [Dragon](#) SpX-13

?? [Falcon 9](#) FT PAZ

?? [CZ-11](#) TY-2, 3, 4, 5 [Tianyi](#)

Launch site: [Jiuquan](#), China



# Blog Gorana Hudeca

??	<a href="#">CZ-3A</a>	FY-2H Fengyun-2H	
??	<a href="#">CZ-2D</a>	GF-6 Gaofen-6	
??	CZ-2	CAS-2A1, CAS-2A2	
??	CZ	YG-32 Yaogan Weixing 31	
??	CZ	YG-32 Yaogan Weixing 32	20
??	CZ	Orbita-1 1	
??	<a href="#">CZ-2D</a>	SaudiSAT 5B	
??	??	LJ-1 Luojia-1	
??	CZ	Huaizong-1	
??	<a href="#">CZ-4C</a>	Hede-1	
??	<a href="#">CZ-3B/E</a>	Alcomsat-1	
??	LS-1	LandSpace-1	
??	<a href="#">CZ-2C</a>	??	
Launch site: <a href="#">Xichang</a> , China			
??	CZ-6	Jilin-1-04 (Lingqiao 1-04), Jilin-1-05 (Lingqiao 1-05), Jilin-1-06 (Lingqiao 1-06), Jilin-1-07 (Lingqiao 1-07)	
??	<a href="#">CZ-2D</a>	GF-5 Gaofen-5	10
??	<a href="#">CZ-4B</a>	FY-3D Feng Yun-3D	
??	<a href="#">CZ-3B/G2</a>	ZX-6C Zhongxing-6C	
??	<a href="#">CZ-3B/YZ-1</a>	<a href="#">Beidou 3</a> MEO M3, <a href="#">Beidou 3</a> MEO M4	
??	<a href="#">CZ-3B/YZ-1</a>	<a href="#">Beidou 3</a> MEO M5, <a href="#">Beidou 3</a> MEO M6	
??	<a href="#">CZ-3B/YZ-1</a>	<a href="#">Beidou 3</a> MEO M7, <a href="#">Beidou 3</a> MEO M8	
??	<a href="#">CZ-3C</a>	<a href="#">Beidou 3</a> G8	
??	<a href="#">H-2A</a> (F37)	GCOM-C	
??	<a href="#">H-2A</a>	<a href="#">IGS Optical-6</a>	
??	<a href="#">Simorgh</a>	<a href="#">Dosti</a> (Nahid 1??) (Payam-e Amir Kabir??)	
Launch site: <a href="#">Semnan</a> , Iran			
13 + (9)			
57 + (64)			

## 2018.

Jan10.	<a href="#">Zenit 3 SL</a> / <a href="#">Fregat-SB</a>	Lybid'
Jan18.	<a href="#">Atlas 5</a> 401 (AV076)	SBIRS-GEO 4
Jan20.	<a href="#">Vega</a> (VV11)	Aeolus / ADM
Jan23.	<a href="#">Ariane 5</a> ECA (VA241)	Al Yah 3
Jan26.	<a href="#">Falcon 9</a> FT	<a href="#">Dragon</a> SpX-14
??	<a href="#">Falcon 9</a> FT	<a href="#">Iridium Next</a> Flight 5 (x10)
Launch site: <a href="#">Vandenberg</a> , USA		
??	<a href="#">Soyuz-2-1B/Fregat-M</a>	<a href="#">Glonass-M</a> / 52



# Blog Gorana Hudeca

??	<a href="#">Falcon 9</a> FT	Telstar 18	
??	<a href="#">Falcon 9</a> FT	Telstar 19	
??	<a href="#">PSLV</a>	ScatSat	
<b>Feb09.</b>	<b><a href="#">Soyuz-2 1A</a></b>	<b><a href="#">Progress MS 8</a></b>	
<b>Feb20.</b>	<b>CZ</b>	<b>Taurus-1</b>	
Feb??	<a href="#">Falcon 9</a> FT	<a href="#">Iridium Next</a> Flight 6 (x10)	
Feb??	<a href="#">CZ-3B/YZ-1</a>	Beidou 3 MEO M9, Beidou 3 MEO M10	
Feb??	H-2B (F7)	HTV7	
??	<a href="#">Soyuz-2-1B/Fregat-M</a>	Meteor M-2-2, Ionosfera 3, Ionosfera 4	
??	<a href="#">Soyuz ST B/Fregat-MT</a> O3b		
??	<a href="#">Soyuz-2-1B</a>	Labirint 11	
??	<a href="#">Soyuz-2-1B</a>	Pion	
<b>Mar01.</b>	<b><a href="#">Atlas 5 (541)</a></b>	<b>GOES-S</b>	<b>140</b>
<b>Mar06.</b>	<b><a href="#">PSLV</a></b>	<b>Team Indus</b>	
<b>Mar09.</b>	<b><a href="#">Falcon 9 (SPx-DM1)</a></b>	<b>Dragon v2 unmanned test</b>	
<b>Mar09.</b>	<b><a href="#">Soyuz-2 1A</a></b>	<b><a href="#">Soyuz MS 8 (S55/56)</a></b>	
CDR: <b>Арте́мьев (O. G. Artemyev)</b> , Andrew <b>J. Feustel</b> , Ricky <b>R. Arnold</b>			
<b>Mar14.</b>	<b><a href="#">Antares 230</a></b>	<b><a href="#">Cygnus Orb-9E</a></b>	
<b>Mar15.</b>	<b><a href="#">CZ-3B/GII</a></b>	<b>APStar-6C</b>	
Mar??	<a href="#">GSLV</a> Mk II D9	Chandrayaan 2	
India's second mission to the moon called <i>Chandrayaan - II</i> is likely to be launched by GSLV MkII. The project will include a robotic vehicle that will move around on after achieving a soft landing on the moon.			
Mar??	<a href="#">PSLV</a>	Cartosat-3	
Mar??	<a href="#">CZ-3B/YZ-1</a>	Beidou 3 MEO M11, Beidou 3 MEO M12	
Mar??	<a href="#">Rokot / Briz KM</a>	Sentinel 3B	
Mar??	<a href="#">Falcon 9</a> FT	SAOCAM 1A	
Mar??	<a href="#">Soyuz ST B/Fregat-MT</a>	OneWeb smalsat (x10)	
Mar??	<a href="#">Ariane 5</a> ECA	Hylas 4	
??	<a href="#">GSLV</a> MK III D2	GSAT-20	
??	KZ-1A	??	
??	KZ-1A	??	
??	KZ-1A	??	
??	KZ-1A	??	
??	<a href="#">Falcon 9</a> FT	SES-12	
??	<a href="#">Ariane 5</a> ECA	Azerspace 2 (Intelsat 38) / SES 14 GOLD	
??	<a href="#">Ariane 5</a> ECA	GSAT-11	<b>120</b>
??	<a href="#">Proton-M/ DM 3</a>	Kosmos	
??	SS-520-4	Tricom-1R	
<b>Apr18.</b>	<b><a href="#">Atlas 5 551 (AV81)</a></b>	<b>AFSPC-11</b>	
<b>Apr27.</b>	<b><a href="#">Soyuz-2 1A</a></b>	<b><a href="#">Soyuz MS 9 (S56/57)</a></b>	



# Blog Gorana Hudeca

**CDR: Прокопьев (S. V. Prokopyev), Jeanette J. Epps, Alexander Gerst**

Apr?? [Falcon 9](#) FT [Iridium Next](#) Flight 7 (x10)  
 Apr?? [H-2A](#) GOSAT-2  
 Apr?? Epsilon OrigamiSat-1

**May05. [Atlas 5 401](#) InSight**  
 Launch site: [Vandenberg](#), USA

May?? [Ariane 5](#) ECA GEO-KOMPSAT-2A  
 May?? [CZ-3B](#)/YZ-1 Beidou 3 MEO M13, Beidou 3 MEO M14

**June27. [Soyuz-2 1A](#) [Progress MS 9](#)**

June?? CZ L2 Chang'e 4 communications relay satellite  
 June?? CZ-2C Pakistani Remote Sensing Satellite (PRSS) 1  
 June?? [Falcon 9](#) FT [Iridium Next](#) Flight 8 (x5), GRACE FO\_1, FO\_2  
 June?? [Falcon 9](#) FT TESS  
 June?? [Atlas 5](#) 422 (AV80) CST-100 Starliner (unmanned test)

?? [GSLV](#) MK II F11 GSAT-10A  
 Launch site: [Satish Dhawan Space Centre](#), Sriharikota, India

?? [Proton-M](#) PTK NP  
 ?? [Vega](#) TARANIS  
 ?? [Soyuz ST](#) CSO 1 100  
 ?? [Vega](#) Prisma  
 ?? [Proton-M/Briz-M](#) Kosmos  
 ?? [Proton-M/DM-03](#) [Glonass-M/](#) ??  
 ?? [Angara A5/Briz-M](#) Kosmos  
 ?? [Ariane 5](#) ECA Hellas-Sat-4

**July31. [Delta 4-H](#) [Parker Solar Probe](#)**

July?? [PSLV](#) Oceansat-3  
 July?? [Falcon 9](#) FT Radarsat C-1, -2, C-3

?? [Falcon 9](#) (SPx-DM2) Dragon v2  
**CDR: Robert Behnken ,Eric Boe**

Aug?? [CZ-3C](#) Beidou 2 I7  
 Aug?? [Soyuz-2](#) [Progress MS](#) 10  
 Aug?? [Delta IV](#)-M+(4,2) GPS III-1  
 Aug?? [Falcon 9](#) FT [Dragon](#) SpX-15

?? [Soyuz ST](#) B/[Fregat](#)-MT OneWeb smalsat (x32)  
 ?? [Soyuz-2](#) 1B /[Fregat](#)-M Glonass K1 / 16  
 ?? [Falcon 9](#) FT PSN VI  
 ?? [Atlas 5](#) (531) (AV073) AEHF-4

**Sep12. [Delta II 7320-10C](#) [ICESat-II](#)**

**Sep15. [Delta 4-H](#) [NROL-71](#)**

**Sep30. [Soyuz-2 1A](#) [Soyuz MS 10 \(S57/58\)](#)**



# Blog Gorana Hudeca

**CDR:** Алексей **Овчинин** (Aleksei **N. Ovchinin**), **Н. Тихонов** (N. **Tikhonov**), Nick **T. Hague**,  
80

Sep?? **Proton-M** rocket to launch **Spektr-Rentgen-Gamma X-Ray** observatory from Baikonur. 1900 kg Spectr-RG is a joint Russian-German X-ray observatory carrying two telescopes developed and produced by German and Russian partners. The primary instrument is German eRosita, complemented by Russian ART-XC. Main tasks of the project are studies of the sky in X-ray energy range, which can provide clues for the mystery of dark energy.

Sep?? **CZ-3B/YZ-1** Beidou 3 MEO M15, Beidou 3 MEO M16  
Sep?? **Ariane 5** ECA DSN 1 (Superbird-8)

?? **Soyuz-2** 1B /**Fregat**-M Glonass K1 / 17  
?? **Ariane 5** ECA EDRS-C (Hylas 3)  
?? **Ariane 5** ECA Intelsat 7C  
?? **Falcon 9** GPS IIIA-2

**Oct05. Ariane 5 BepiColombo** ESA and ISAS Mercury Orbiters

**Oct15. Ariane 5 ES JWST (James Webb Space Telescope)**

**Oct16. Soyuz-2 Progress MS 11**

Oct?? **Soyuz ST** B/**Fregat**-M MetOp-C  
Oct?? **CZ-3C** Beidou 3 G1Q  
Oct?? **Proton-M/Briz-M** Elektro L – 3  
Oct?? **Antares** 230 **Cygnus** Orb-10E

?? **Proton-M/** DM-03 **Glonass-M/K18,K19,K20**  
?? **Ariane 5** ECA Intelsat 39  
?? **Ariane 5** Horizon 3e  
?? **Falcon 9** FT ORS-6

**Nov25. Proton-M MLM**

**Nov30. Soyuz-2 1A Soyuz MS 11 (S58/59)**

**CDR:** Кононенко (Oleg **Kononenko**), Serena **Auñón-Chancellor**, David **Saint-Jaques** 60

?? Minotaur 1 NROL 111  
?? **Soyuz ST** B/**Fregat**-MT OneWeb smalsat (x32)  
?? **Soyuz-2** 1B /**Fregat**-M Glonass K1 / 15

Dec?? **Atlas 5** 422 (AV082) CST-100 Starliner

**CDR:** Hurley, Behnken

Dec?? **CZ-3B/GIII** Chang'e-4 (Moon far side Aitken Basin lander/rover)  
Dec?? **CZ-3B/YZ-1** Beidou 3 MEO M17, Beidou 3 MEO M18  
Dec?? **Soyuz-2** 1B /**Fregat**-M Resurs №4  
Dec?? ?? Korean Pathfinder Lunar Orbiter

?? Falcon H Circumlunar Dragon V2  
?? **Soyuz-2-1B/Fregat**-M Glonass K2 / 14  
?? **Ariane 5** Heinrich Hertz

?? **Falcon 9** v1.2 OHB SARah satellite (x2)  
?? **Falcon 9** v1.2 WGS 10  
?? Minotaur-4 FORMOSAT-7 (6 sat)



# Blog Gorana Hudeca

??	<a href="#">Atlas 5</a> 551	AFSPC-7	
??	??	AEHF 5	
??	<a href="#">Falcon 9</a> FT	Es'hail 2	
??	Falcon H	Arabsat 6A	
??	Falcon Heavy	STP-02	
??	<a href="#">Soyuz-2</a> 1B	Progress M-UM	40
??	<a href="#">Soyuz-2</a> 1A / Fregat	Kanopus V 5, Kanopus V 6	
??	<a href="#">Proton-M/Briz-M</a>	EutelSat 5 West B / MEV	
??	<a href="#">Proton-M/Briz-M</a>	Kosmos	
??	<a href="#">Proton-M/Briz-M</a>	Ямал-601	
??	<a href="#">Proton-M/Briz-M</a>	Ямал-GK-1	
??	<a href="#">Proton-M/Briz-M</a>	EgyptSat 3	
??	<a href="#">Soyuz-2</a> -1B/ <a href="#">Fregat</a> M	Meridian 18L	
??	<a href="#">Soyuz-2</a> 1A	Bars-M 3	
??	<a href="#">Soyuz-2</a> 1A	Energiya-100	
??	<a href="#">Soyuz-2</a> -1B/ <a href="#">Fregat</a> -M	Glonass M 55	
??	<a href="#">Soyuz-2</a> -1B	Obzor R -1	
??	Dnepr	<a href="#">UniSat-7</a>	
Launch site: ( <a href="#">Dombrovskiy</a> ), Russia			
??	<a href="#">Angara</a> 1.2	Kosmos	
??	<a href="#">Ariane 5</a> ES	<a href="#">Galileo-FOC</a> FM19 (Tara), <a href="#">Galileo-FOC</a> FM20 (Samuel), <a href="#">Galileo-FOC</a> FM21 (Anna), <a href="#">Galileo-FOC</a> FM22 (Ellen)	
??	<a href="#">CZ-2D</a>	SJ-12 Shijian-12 (2)	
??	<a href="#">CZ-2D</a>	TH-2 Tianhui-2	
??	<a href="#">CZ-2C</a>	CSES-1 Earthquake electromagnetism monitor satellite	
??	??	FY-3 Fengyun-3 RM-1	
??	??	VeneSat-2	
??	<a href="#">CZ-3B/E</a>	CC-1 <a href="#">Changcheng-1</a>	20
??	CZ-2D	GF-7 Gaofen-7	
??	CZ	CBERS-SAR 1	
??	CZ	Deep Space Solar Observatory	
??	CZ	CBERS-4B	
??	<a href="#">CZ-3B/E</a>	SupremeSAT-II	
??	<a href="#">CZ-3B/E</a>	CongoSat 1	
??	<a href="#">CZ-3B/E</a>	Apstar-6D	
??	??	Small Military Meteorological Satellite (x6)	
??	CZ	FY-3E Fengyun-3E	
??	CZ	FY-4B Fengyun-4B	
??	<a href="#">CZ-4B</a>	<a href="#">Haiyang-1C</a>	HY-1C
Launch site: <a href="#">Taiyuan</a> , China			
??	CZ-??	<a href="#">CAS-4A</a> , <a href="#">CAS-4B</a>	
Launch site: <a href="#">Taiyuan</a> , China			
??	CZ-4B	HY-1D Haiyang-1D	



# Blog Gorana Hudeca

?? CZ-4B HY-2B Haiyang-2B

?? [GSLV](#) MK II F12 GSAT-7A  
 ?? [GSLV](#) MK II F10 GISAT  
 ?? [PSLV](#) EnMap

?? [Safir 1 B](#) Tadbir  
 ?? Safir 3A Pars sepher

?? Tronador II/VEX5 TBD (suborbital)  
 Launch site: Puerto Belgrano, Argentina

159

## 2019.

Jan?? [Atlas 5](#) 531 [Cygnus](#) OA-11

Feb?? [CZ-3C](#) Beidou 3 I1Q  
 Feb?? [Falcon 9](#) GPS IIIA-3  
 Feb?? H-2B (F9) HTV8  
 Feb?? [Atlas 5](#) [Solar Orbiter](#) (Solo) (ESA)

?? [Soyuz-2-1B](#) Arktika M 1  
 Launch site: Восточный (Vostochniy), Cosmodrome, Russia

**Mar30.** [Soyuz-2 1A](#) [Soyuz MS 12](#)  
 CDR: **Vinogradov**, **Tikhonov**, Shannon **Walker**

Mar?? [Soyuz-2](#) [Progress MS 12](#)  
 Mar?? [Vega](#) Seosat (Ingenio)  
 Mar?? [Ariane 5](#) ECA GEO-KOMPSAT-2B , Cheollian 2B

?? [Soyuz ST B/Fregat](#)-MT OneWeb smalsat (x32)  
 ?? [Soyuz-2-1B/Fregat](#) Glonass K2 / 13

Apr?? ?? GOES-T  
 Apr?? [CZ-3B/E](#) Nicasat 1  
 Apr?? [CZ-3C](#) Beidou 3 I2Q

?? CZ7 TZ 2 Tianzhou 2 (Logistic Cargo Vechile)

June?? [Atlas 5](#) 551 STP-03  
 June?? [Ariane 5](#) MTG-I1

?? [PSLV](#) RISAT 1A  
 ?? [CZ-3B/G2](#) TECSTAR 1

July?? [CZ-3C](#) Beidou 3 I3Q

Aug?? [Soyuz ST B/Fregat](#)-MT EarthCare

**Sep30.** [Soyuz-2 1A](#) [Soyuz MS 13](#)  
 CDR: ??, Luca **Parmitano** (ESA) , Anne **McClain** (NASA)





# Blog Gorana Hudeca

Sep??	<a href="#">Soyuz-2-1B/Fregat-M</a>	Glonass K1 / 22
Oct??	<a href="#">CZ-3B/YZ-1</a>	Beidou 3 MEO M19, Beidou 3 MEO M20
Oct??	<a href="#">Soyuz-2 1B /Fregat-M</a>	<a href="#">Gonets</a> x 3 (No 27,28,29)
Oct??	<a href="#">Soyuz-2 1B /Fregat-M</a>	Resurs N°5
<b>Nov29.</b>	<b><a href="#">Soyuz-2 1a / Fregat</a></b>	<b>Luna 25 (Luna-Glob-1)</b>
Nov??	SLS-1 Orbit (DRO) Tactical DRM	Orion (unmanned trip around the Moon) Exploration Mission 1 (Distant Retrograde)
??	Vega	Proba 3
Dec??	<a href="#">CZ-3B/YZ-1</a>	Beidou 3 MEO M21, Beidou 3 MEO M22
Dec??	<a href="#">Proton-M/Briz-M</a>	Ekspress 80, Ekspress 103
Dec??	<a href="#">Proton-M/Briz-M</a>	Elektro L - 4
??	<a href="#">Falcon 9</a> v1.1	USCV-1 (US Commercial Vehicles)
??	<a href="#">Atlas 5</a> 402	USCV-2 (US Commercial Vehicles)
??	<a href="#">Falcon 9</a> FT	<a href="#">Dragon</a> SpX-16
??	<a href="#">Falcon 9</a> FT	<a href="#">Dragon</a> SpX-17
??	<a href="#">Falcon 9</a> FT	<a href="#">Dragon</a> SpX-18
??	<a href="#">Falcon 9</a> v1.1	Astrium active SARah satellite
??	<a href="#">Falcon 9</a>	GPS IIIA-6
??	<a href="#">Falcon 9</a> v1.2	GPS IIIA-7
??	<a href="#">Falcon 9</a> v1.2	GPS IIIA-8
??	<a href="#">Delta IV-M+(4,2)/ <a href="#">Atlas 5</a> 421</a>	GPS IIIA-9/GPS IIIB-1
??	<a href="#">Delta IV-M+(4,2)/ <a href="#">Atlas 5</a> 421</a>	GPS IIIA-10/GPS IIIB-2
??	<a href="#">Atlas 5</a> 551	Asteroid Retrieval Spacecraft (ARS)
??	??	EX-3
??	??	AEHF-6
??	<a href="#">Vega</a>	Jason-CS A
??	<a href="#">Vega</a>	EarthCare
??	<a href="#">Vega</a>	OpSis
??	<a href="#">Vega</a>	VNREDSat
??	<a href="#">Vega</a>	LOTUSat
??	<a href="#">Vega</a>	Cosmo-SkyMed Secon Gen 1 CSG-1
??	<a href="#">Ariane 5</a> ECA	Jabiru 2
??	<a href="#">Ariane 5</a>	Arsat 3
??	<a href="#">Ariane 5</a> ECA	Jabiru-1
??	<a href="#">Ariane 5</a> ECA	Eutelsat Quantum
??	<a href="#">Ariane 5</a> ECA	African Broadband Satellite
??	<a href="#">Soyuz ST / <a href="#">Vega</a></a>	MicroCarb
??	<a href="#">Soyuz ST</a> B/ <a href="#">Fregat</a> -MT	Sentinel-1C
??	<a href="#">Ariane 5</a>	ViaSat-3
??	<a href="#">Ariane 5</a>	JCSat 17
??	<a href="#">Soyuz-2</a>	<a href="#">Progress MS</a> 13
??	<a href="#">Soyuz-2-1A/Fregat-M</a>	Kondor-FKA n.º 1
??	<a href="#">Soyuz-2-1B/Fregat-M</a>	Arktika M 2



# Blog Gorana Hudeca

??	<a href="#">Proton-M/Briz-M</a>	SkyTerra 2
??	<a href="#">Proton-M/Briz-M</a>	Ekspress AMU 3 / Ekspress AMU 7
??	<a href="#">Proton-M/Briz-M</a>	Luch 5M
??	<a href="#">Proton-M/Briz-M</a>	Yenisey A1
??	<a href="#">Proton-M/Briz-M</a>	Ямал-501
??	<a href="#">Proton-M/Briz-M</a>	EutelSat
??	<a href="#">Proton-M/Briz-M</a>	IntelSat
??	<a href="#">Soyuz-2-1B/Fregat</a> M	Meridian 19L
??	<a href="#">Soyuz-2-</a>	Razdan 1
??	<a href="#">Soyuz-2-1B/Fregat</a> -M	<a href="#">Glonass-M/</a> 53
??	<a href="#">Soyuz-2-1B/Fregat</a>	Glonass M/ 58
??	<a href="#">Soyuz-2-1B/Fregat</a>	Glonass M / 59
??	<a href="#">Soyuz-2-1B/Fregat</a>	Glonass M / 60
??	CZ-5	Chang'e-5 (Sample return)
??	CZ	FY-3F Fengyun-3F (Batch 2)
??	CZ	FY-3 Fengyun-3 RM-2
??	<a href="#">CZ-4B</a>	HY-2D Haiyang-2D
??	CZ	Sun Fixed-Point Observation
??	CZ	HY-3A Haiyang-3A
??	<a href="#">CZ-4B</a>	HY-2C Haiyang-2C
??	<a href="#">PSLV</a> XL	<a href="#">Aditya'</a>

## 2020.

Jan?? [Falcon 9](#) v1.1 USCVC-3 (US Commercial Vehicles)

**Mar30. Soyuz 2-1A Sojuz MS-15**

Mar?? [Delta IV](#)-M DMSP-5D3 F20

Mar?? [Soyuz-2-1B/Fregat](#)-M Glonass K1 / 22

?? CZ-5 Tian He Space Station Core Module

Apr?? [CZ-3B](#)/YZ-1 Beidou 3 MEO M23, Beidou 3 MEO M24

Apr?? Angara-1.2/AM [Gonets](#) x 3 (No 30,31,32)

?? CZ-5B Wentian Lab module Space station module

?? CZ-2F/G SZ-12 Shenzhou-12

?? [CZ-3B/G2](#) ZX-18 Zhongxing-18

June?? Ariane MTG-S1/Sentinel-4A

June?? [CZ-3C](#) Beidou 3 G3Q

?? [Soyuz ST](#) B/[Fregat](#)-MT MetOp-SG A1/EP-SG-a/Sentinel-5A

?? [Proton-M/Briz-M](#) ExoMars (CM+DM)

**July16 Ariane 64 ??**



# Blog Gorana Hudeca

July?? [Atlas 5](#) (541) [Mars 2020 rover](#) NASA's exit from a joint sample-collection campaign with Europe aims to send a \$700 million mission to the red planet in 2018 or 2020. The replanned Mars mission, referred to in budget documents as Mars Next Generation, will carry a price tag that falls somewhere between that of the 2013 Maven Scout mission and the 2005 Mars Reconnaissance Orbiter, which cost \$485 million, and more than \$720 million, respectively.

July?? [CZ-3C](#) Beidou 3 G2Q

?? CZ 5 [Mars probe](#) (orbiter + lander + rover)

**Aug05.** [Proton-M/Briz-M](#) **ExoMars** An ESA exobiology rover equipped with a deep drill developed by Astrium Satellites in the United Kingdom will launch in 2018. A Russian-built entry, descent and landing package will shepherd the rover to the red planet's surface.

**Sep30.** **Soyuz 2-1A** **Sojuz MS-16**

Sep?? CZ CBERS-6  
 Sep?? [Soyuz-2-1B/Fregat-M](#) Glonass K2 / 15

?? CZ-2F/G SZ-13 Shenzhou-13

Dec?? [Soyuz ST B/Fregat](#) MT Euclid  
 Euclid will depart Earth on a Soyuz rocket launched from French Guiana and head for the L2 Lagrange point.

**Dec15.** [Atlas 5](#) **Landsat 9**

?? GSLV-Mk III. Dr B N Suresh and Mr Madan Lal, Vikram Sarabhai Space Centre (VSSC) presented the concept for the manned space mission including the development of an autonomous Orbital Vehicle (4,000kg manned capsule).

?? ?? SWOT  
 ?? ?? PACE  
 ?? ?? EX-4  
 ?? ?? ACE  
 ?? ?? HypIRI  
 ?? Antares IMAP/STP-05

?? [Atlas 5](#) 402 USCVC-4 (US Commercial Vehicles)

?? [Falcon 9](#) FT [Dragon](#) SpX-19  
 ?? [Falcon 9](#) FT [Dragon](#) SpX-20  
 ?? [Falcon 9](#) FT [Dragon](#) SpX-21  
 ?? [Antares](#) 230 [Cygnus](#) OA-12  
 ?? [Atlas 5](#) 552 Dream Chaser Cargo System SNC-1

?? Falcon H ViaSat 3

?? [Proton-M](#) HEM-1

?? [Soyuz-2](#) [Progress MS](#) 14  
 ?? [Soyuz-2](#) [Progress MS](#) 15  
 ?? [Soyuz-2](#) [Progress MS](#) 16

?? [Soyuz-2-1B/Fregat-M](#) Arktika M 3  
 ?? [Soyuz-2-1B/Fregat-M](#) Glonass K2



# Blog Gorana Hudeca

??	<a href="#">Soyuz-2-1B/Fregat-M</a>	<a href="#">Resurs PM - 1</a>
??	<a href="#">Soyuz-2-1B/Fregat-M</a>	Meteor M No2-3
??	<a href="#">Angara 1.2</a>	Kompsat-6
??	<a href="#">Soyuz-2-1A/Fregat-M</a>	<a href="#">Gonets</a> x 6
??	<a href="#">Proton-M/Briz-M</a>	AOneSat-1
??	<a href="#">Proton-M/Briz-M</a>	Terrestar-2
??	<a href="#">Proton-M/Briz-M</a>	SkyTerra 2
??	<a href="#">Soyuz-2-1A/Fregat</a>	Resonance 1A, Resonance 1B
RESONANCE is a project to study Earth's magnetosphere consisting of four similar satellites.		
??	<a href="#">Soyuz-2-1B</a>	Lotos S1
??	<a href="#">Soyuz-2-1B</a>	Persona
??	<a href="#">Soyuz-2-1A</a>	Kobalt M
??	<a href="#">Soyuz-2-1A</a>	Foton M
??	??	Zond
??	??	MKA PN6 (Monika)
??	??	Картограф-0Э №1
??	<a href="#">Vega</a>	Sentinel-2C
??	<a href="#">Vega</a>	Sentinel-3C
??	??	Biomass
??	??	Seosat-Ingenio-2
??	??	EPS-SG-b
??	CZ5	Chang'e-6
??	CZ	Two Meter Space Telescope
??	CZ	FY-4C Fengyun-4C
??	CZ	HY-3B Haiyang-3B
??	<a href="#">CZ-3B/ Palapa</a>	1N
??	<a href="#">GSLV</a> MK III	MOM-2 Follow on Mars Mission
??	H-IIA	<a href="#">Hope</a> (UAE mission to Mars)
??	H-IIA	<a href="#">Astro H2 (Hitomi-2), SLIM (Smart Lander for Investigating Moon)</a>
??	H-IIA	<a href="#">Inmarsat-6 F1</a>

## 2021.

?? [Soyuz-2](#) [Progress MS](#) 17

**Mar30.** [Soyuz-2-1A](#) **Sojuz MS-17**

Apr?? [Soyuz ST B/Fregat](#) M MarcoPolo-R

June?? [Atlas 5](#) 402 / [Falcon 9](#) USCV-5 (US Commercial Vehicles)

?? CZ7 TZ 3 Tianzhou 3 (Logistic Cargo Vechile)

?? [Soyuz-2](#) [Progress MS](#) 18

?? CZ-2F/G SZ-14 Shenzhou-14

July?? Vulcan/Minotaur 6/[Falcon 9](#) v1.1 JPSS-2



# Blog Gorana Hudeca

Aug?? SLS Block I Orion: Exploration Mission 2 (Crew to Cislunar) Mission)

**Sep30.** [Soyuz-2-1A](#) **Sojuz MS-18**

Oct?? [Atlas 5](#) 401/[Falcon 9](#) v1.1 JPSS Free Flyer 2 (TSIS-2)

Dec?? [Atlas 5](#) 402 / [Falcon 9](#) USCV-6 (US Commercial Vehicles)

?? [Atlas 5](#) 552 Dream Chaser Cargo System SNC-2

?? SLS Block I Europa Clipper

?? [Soyuz-2](#) [Progress MS](#) 19

?? [Soyuz-2](#)-1B/[Fregat](#)-M Transformable Modul TM

?? [Soyuz-2](#) 1a / [Fregat](#) [Luna 26](#) (Luna-Resurs OA)

?? [Soyuz-2](#)-1B/[Fregat](#)-M Resurs PM - 2

?? [Soyuz-2](#)-1B/[Fregat](#)-M Meteor M No2-4

?? [Soyuz-2](#)-1B/[Fregat](#)-M Meteor M No3

?? [Angara](#) 1.2 [Gonets](#) x 3

?? [Proton-M/Briz-M](#) Elektro L - 5

?? [Proton-M/Briz-M](#) Ekspress-RV1, Ekspress-RV2

?? [Proton-M/Briz-M](#) Ekspress AMU 4

?? [Soyuz-2](#)-1B/[Fregat](#)-M Smotr R №1

?? [Proton-M/Briz-M](#) IntelSat

?? [Vega](#) Sentinel-1A 2nd Gen

?? [Vega](#) Space Rider

?? [Soyuz ST](#) / [Vega](#) Merlin

?? CZ Venus Global Sensing Probe

?? CZ FY-3G Fengyun-3G (Batch 2)

## 2022.

Jan?? ?? Solar Sentinels

?? [Soyuz-2](#) [Progress MS](#) 20

Mar17. CZ3 Asteroid rendezvous and touchdown Rendezvous with the asteroid Apophis on 18 March 2023, entering its orbit. After 220 days, the probe will depart and then proceed toward asteroid 2002EX11. Flyby is expected on 6 October 2025 at a 9.8 km/s speed. Third and final leg of its journey, the probe will make a rendezvous with asteroid 1996FG3 on 1 January 2027 and enter its orbit. After 180 days, the probe will eventually make landing on its surface on 30 June 2027.

**Mar30.** [Soyuz-2-1A](#) **Sojuz MS-19**

Apr?? [Angara](#) A5/ DM 03 Elektro M - 1-2

?? CZ7 TZ 4 Tianzhou 4 (Logistic Cargo Vehicle)

?? CZ-5B Xuntian Lab module Space station module

?? CZ-2F/G SZ-15 Shenzhou-15

June?? [Ariane 5](#)ECA JUICE (Jupiter ICy moon Explorer)



# Blog Gorana Hudeca

June??	Ariane 5	MTG-I2
June??	<a href="#">Atlas 5</a> 402 / <a href="#">Falcon 9</a>	USCV-7 (US Commercial Vehicles)
??	Sunkar ??	
??	<a href="#">Soyuz-2</a>	<a href="#">Progress MS</a> 21
Aug??	H2B	Phobos sample return
<b>Sep30.</b>	<b><a href="#">Soyuz-2-1A</a></b>	<b>Sojuz MS-20</b>
Sep??	<a href="#">Soyuz ST</a> B/ <a href="#">Fregat</a> -MT	MetOp-SG B1
??	Sunkar Federatsia (unmaned)	
Dec??	<a href="#">Atlas 5</a> 402 / <a href="#">Falcon 9</a>	USCV-8 (US Commercial Vehicles)
??	<a href="#">Soyuz-2</a>	<a href="#">Progress MS</a> 22
??	<a href="#">Soyuz-2</a> 1b	Luna 27 (Luna-Resurs PA) Testing an adaptive landing mode with a radio-beacon; delivering a rover
??	<a href="#">Proton-M/Briz-M</a>	Ekspress – AMU 5
??	<a href="#">Proton-M/Briz-M</a>	Ekspress – AMU 6
??	<a href="#">Proton-M/Briz-M</a>	Ekspress – RV 3, Ekspress – RV 4
??	<a href="#">Angara</a> 1.2	<a href="#">Gonets</a> x 3
??	<a href="#">Soyuz-2-1B/Fregat</a> -M	Meteor M No2-5
??	<a href="#">Proton-M/Briz-M</a>	Eutelsat
??	<a href="#">Proton-M/Briz-M</a>	Intelsat
??	<a href="#">Soyuz-2-1B/Fregat</a> -M	Smotr R №2
??	<a href="#">Soyuz-2-</a>	<a href="#">Razdan 2</a>
??	<a href="#">Ariane 5</a>	Moon's south pole samples return mission
??	<a href="#">Vega</a>	Jason-CS B
??	Ariane 5	ATHENA
??	CZ	HY-3C Haiyang-3C
<b>2023.</b>		
??	<a href="#">Soyuz-2</a>	<a href="#">Progress MS</a> 23
<b>Mar30.</b>	<b><a href="#">Soyuz-2-1A</a></b>	<b>Sojuz MS-21</b>
??	CZ7	TZ 5 Tianzhou 5 (Logistic Cargo Vechile)
??	CZ-2F/G	SZ-16 Shenzhou-16
June??	<a href="#">Atlas 5</a> 402 / <a href="#">Falcon 9</a>	USCV-9 (US Commercial Vehicles)
??	<a href="#">Soyuz-2</a>	<a href="#">Progress MS</a> 24
<b>Sep30.</b>	<b><a href="#">Soyuz-2-1A</a></b>	<b>Sojuz MS-22</b>
??	<a href="#">Soyuz-2</a>	<a href="#">Progress MS</a> 25
Dec??	<a href="#">Atlas 5</a> 402 / <a href="#">Falcon 9</a>	USCV-10 (US Commercial Vehicles)



# Blog Gorana Hudeca

?? SLS Block IA II Orion: Exploration Mission 3 (Crew to Cislunar)

?? Sunkar Federatsia (unmanned flight to ISS)  
 ?? Sunkar Federatsia (Light 14t – 2 man to ISS)

?? A Russian [Proton/Briz-M](#) (or Angara) rocket to launch the [Laplas-P](#) mission to orbit the moon of Jupiter Ganymede.

?? [Proton-M/Briz-M](#) Ekspres – AT3, AT4  
 ?? [Soyuz-2-1B/Fregat-M](#) Resurs PM - 3  
 ?? [Angara](#) 1.2 [Gonets](#) x 3  
 ?? [Soyuz-2-1B](#) Obzor R -2  
 ?? [Soyuz-2-1B](#) Obzor O -1  
 ?? [Soyuz-2-1B/Fregat-M](#) Ellips - 1  
 ?? [Angara](#) A5P/DM03 Dopler 1, 2

?? [Vega](#) Sentinel-2A 2nd Gen

?? CZ SPORT (Solar Polar Orbit Radio Telescope)  
 ?? CZ FY-4D Fengyun-4D

?? [GSLV](#) MK III Mission to Venus

?? [Angara](#) A5P/DM03 Lutch 5 – 2  
 ?? [Soyuz-2-1b](#) Bion-M No. 2  
 ?? [Angara](#) A5P/DM03 Lutch 5 – 3  
 ?? Ямал GK 2

ПО - Ямал-ГК №3 (ГСО) - ПО - ПО  
 ПО - Экспресс АТ3, Экспресс АТ4 - ПО - ПО  
 ПО - Intelsat - Протон-М/Бриз-М - Байконур  
 ПО - два Гонца-М (№39,40), Гонец-М1 №11 [блок №20] - Ангара-1.2/АМ - Плесецк 35/1  
 ПО - Обзор-О №1 - Союз-2-1А/Фрегат - Восточный 1С  
 ПО - Обзор-Р №2 - Союз-2-1А - Восточный 1С  
 ПО - Ресурс-ПМ №3 - Союз-2-1Б - Восточный 1С

## 2024

**Mar30.** [Soyuz-2-1A](#) **Sojuz MS-23**

?? CZ7 TZ 6 Tianzhou 6 (Logistic Cargo Vehicle)

June?? [Atlas 5](#) 402 / [Falcon 9](#) USCV-11 (US Commercial Vehicles)

**Sep30.** [Soyuz-2-1A](#) **Sojuz MS-24**

Oct?? EELV GOES-U

?? SLS Block IA II Orion: Exploration Mission 4 (Crew to Cislunar)

?? [Soyuz-2](#) [Progress MS](#) 26  
 ?? [Soyuz-2](#) [Progress MS](#) 27  
 ?? [Soyuz-2](#) [Progress MS](#) 28



# Blog Gorana Hudeca

??	<a href="#">Soyuz-2</a> 1b	Luna28 (Luna-Grunt-1)	delivering a new-generation rover for gathering, analysis and uploading of samples
??	<a href="#">Proton-M</a>	/ DM-03	Spektr - UF
??	<a href="#">Proton-M/Briz-M</a>		Ekspress – AMU 9
??	<a href="#">Soyuz-2-1B/Fregat-M</a>		Resurs PM - 4
??	<a href="#">Soyuz-2-1B/Fregat-M</a>		Meteor MP No1
??	<a href="#">Angara</a> 1.2		<a href="#">Gonets</a> x 2, Gonets M
??	<a href="#">Angara</a> A5P/DM03		Lutch 5 – 4
??	??		Ямал GK 3
??	<a href="#">Soyuz-2-1B/Fregat-M</a>		Arktika M 4
??	<a href="#">Angara</a> A5P/DM03		Bumerang (FobosGrunt 2)
??	??		DYNAMIC/STP-06
??	CZ		Asteroid (Ceres) Sample Return Mission
??	Lapan		Pengorbitan-1 (RPS-01) (Indonesia)

начало года - Прогресс МС-26 (№456) - Союз-2-1А - Байконур 31/6  
 30 марта - Союз МС-22 (№752) - Союз-2-1А - Байконур 1/5  
 середина года - Прогресс МС-27 (№457) - Союз-2-1А - Байконур 31/6  
 30 сентября - Союз МС-23 (№753) - Союз-2-1А - Байконур 1/5  
 конец года - Прогресс МС-28 (№458) - Союз-2-1А - Байконур 31/6  
 конец года - ПТК НП "Федерация" (лёгкий 14 т - полёт к МКС с экипажем из 2-х человек) - Союз-5 (Сункар) - Байконур 45/1  
 ПО - Спектр-УФ - Протон-М/ДМ-03 - Байконур  
 ПО - Полярная звезда №1 (Ямал-ГК ВЭО №1) - ПО - ПО  
 ПО - три Гонца-М (№41,42,43) [блок №21] - Ангара-1.2/АМ - Плесецк 35/1  
 ПО - Метеор-МП №1, Зонд-М - Союз-2-1Б/Фрегат-М - Восточный 1С  
 ПО - Арктика-М №4 - Союз-2-1Б/Фрегат-М - Байконур или Восточный 1С  
 ПО - Обзор-Р №3 - Союз-2-1А - Восточный 1С  
 ПО - Ресурс-ПМ №4 - Союз-2-1Б - Восточный 1С  
 ПО - Космос (Раздан №3) - Союз-2 - Плесецк  
 ПО - Луна-28 (Луна-Грунт) - Ангара-А5М/КВТК (ПО) - Восточный 1А  
 ПО - первый пуск - Сункар/ДМ-SLB - Байконур 45/1  
 ПО - ПО - Ангара-А5М/КВТК - Восточный 1А

## 2025

??	SLS Block IA II		Orion: Exploration Mission 5 (Crew to Cislunar)
??	<a href="#">Soyuz-2</a> -1A		Sojuz MS-25
??	<a href="#">Soyuz-2</a>	<a href="#">Progress MS</a> 29	
??	<a href="#">Angara</a> 1.2		<a href="#">Gonets</a> x 3
??	<a href="#">Soyuz-2-1B</a>		Obzor O -2
??	<a href="#">Soyuz-2-1b</a>		Bion-M No. 3
??	<a href="#">Soyuz-2-1B/Fregat-M</a>		Arktika M 5
??	<a href="#">Soyuz-2-1B/Fregat-M</a>		Ellips - 2
??	<a href="#">Angara</a> A5P/KVTK		Enisei A-2
??	<a href="#">Soyuz-2-1B/Fregat-M</a>		Resonans 2A, 2B, МКА-PN5
??	CZ		Chang'e-7 (Moon south pole landing)





## Blog Gorana Hudeca

начало года - Резонанс №3,4 - Союз-2-1Б/Фрегат-М - Восточный 1С  
начало года - Союз МС-24 (№754) - Союз-2-1А - Байконур  
начало года - Прогресс МС-29 (№459) - Союз-2-1А - Байконур  
ПО - Полярная звезда №2 (Ямал-ГК ВЭО №2) - ПО - ПО  
ПО - Полярная звезда №3 (Ямал-ГК ВЭО №3) - ПО - ПО  
ПО - три Гонца-М (№44,45,46) [блок №22] - Ангара-1.2/АМ - Плесецк 35/1  
ПО - Электро-М №1-1 - Ангара-А5М/ДМ-03 - Восточный 1А  
ПО - Арктика-М №5 - Союз-2-1Б/Фрегат-М - Байконур или Восточный 1С  
ПО - Обзор-О №2 - Союз-2-1А/Фрегат - Восточный 1С  
ПО - Бион-М №3 - Союз-2-1Б - Байконур

### 2026.

June??	<a href="#">Angara</a> A5P/KVTK	A mission to Venus ( <i>Venera D</i> ) would be launched
??	CZ	Jupiter Orbiter
??	CZ	Mars Sample Return
??	CZ	Chang'e-8 (Moon north pole landing)