

ICRA 2019 RoboMaster AI Challenge

FAQs (as of 2019.03.15)

About the technical proposal:

关于技术方案:

1. Is the technical proposal reviewed in "First come, first review" after submission or reviewed all together after the deadline?

A: The technical solution proposal will be reviewed in "First come first review". After registering, you can also find this information on the Overview of the registration system - Technical Proposal. This setting is for the team to get the discount and prepare for the competition as soon as possible. However, it should be noted that the technical proposal needs to be written according to the rules, highlighting the rationality of the program and the team's experience and advantages in related algorithms or systems to ensure the overall content quality.

1、技术方案是先提交先审核，还是 DDL 之后一起审核？

答：技术方案是先提交先审核。大家通过报名后，也可以在报名系统-技术方案的 Overview 上面看到这个信息，这个设置是为了让队伍早日拿到优惠，早日准备比赛。但是需要注意的是，技术方案需要按照规则要求进行撰写，突出方案的合理性和队伍在相关算法或者系统方面的经验和优势，保证整体内容质量。

2. Is there a template for the technical proposal?

A: Yes, see the rules manual for details.

2、技术方案有模板吗？

答：有，详见规则手册。

3. Can the technical proposal exceed the specified number of pages? (2019.1.8)

A: For technical proposal, please try to condense the content and focus on key content. If there are still too many words, please put some of the less important content in the appendix, or attach the relevant information links or video links in the appendix

3、技术方案超过规定的页数可以吗？（2019.1.8）

答：技术方案大家可以尽量压缩，挑重点去写，实在字数比较多的，可以整理一些次重点的内容在附录中，或者附相关的资料链接或者视频链接在附录中。

4. For 2019 technical proposal, only English version can be accepted?

A: Yes.

4、2019 年的技术方案只能接受英文吗？

答：是的。

About the venue:

关于场地:

1. Is there any details of the venue?

A: Yes, the parameters of the venue are detailed in the rules manual, and the details of the supply station will be updated later.

1、场地细节有吗？

答：有，场地的参数详见规则手册，之后会更新补给站的细节参数。

2. What is the cover material around the competition venue. Is the material colored? Is it a matte material? (2019.1.8)

A: The cover around the venue is divided into three layers: bottom layer, layer with the height of the robot and the top layer. The bottom layer of cover is a solid wooden enclosure, which will ensure the normal operation of the radar. The layer with the height of the robot is currently a transparent enclosure, we are considering adding some matte material to prevent specular reflection. The top layer should still be transparent, in order to provide a high quality game watching. The detailed plan will be released in February 2019.

2、比赛场地周围的围挡是什么材料，有颜色吗，是否为磨砂材质？（2019.1.8）

答：比赛场地周围的围挡，最底层是实体木质围挡，会保证雷达的正常运行，车身高度的透明围挡，会考虑添加部分磨砂材质的以防止镜面反射；最上方的围挡，为了观赛效果应该仍然会透明。具体方案将于2019年2月份发布。

3. What is the material and color of the floor of the competition venue?

A: The floor covered with 3mm or 3.5mm thick soft PVC sheet with embossed grain.

3、比赛场地的地板材料、颜色是什么？

答：灰色荔枝纹3mm或者3.5mm的地胶。

4. Does the supply station in the competition need to be built by yourself?

A: No.

4、场地的补给站需要自己制作吗？

答：不需要。

5. How many UWB base stations are installed in the competition?

A: 4

5、比赛的时候，场地上会安装几个 UWB 基站？

答：4 个。

6. Does the supply station supply bullets once the signal is sent? Or the robot has to stay in supply station for 5 seconds or more.

A: The supply station supplies bullets once the signal is sent. The duration of supplying is ~3 seconds.

6、弹药补给区域是发了指令就补给，还是要在补给区站 5 秒以上？

答：发了就补给，补给时间在 3s 左右完成。

7. Does the defense buff (30s) is cleared once the robot leaves the defense buff zone?

A: No. The robot is free to leave once the buff is activated.

7、防御加成的 30s 在机器离开加成区后会清零吗？

答：不会，成功激活后就和 buff 区域没关系了。在下次 buff 刷新前，机器人不用一直在防御 buff 区域。

8. Where does the robot has to stay in the defense buff zone to activate the buff? Eg.

Does the timer start if the RFID is inside the square?

A: Staying the square usually can active the buff. However, there are chances of failure.

The referee system will forward related field information to the robot. The robot can get the information if the buff is activated.

8、请问机器人处于防御加成区什么位置会触发，比如，只要 RFID 在正方形内就计时吗？

答：在防御加成区内一般会触发，但是有小概率无法触发，但是裁判系统会转发相关场地信息给机器人，机器人是可以获取到是否触发的信息的。

About material purchase and robot rental:

关于物资购买和租赁:

1. For the new team, the funds are limited. How to participate in the competition?

A: After the registration is passed, the team can purchase the robot platform at a minimum of 20% off. If the funds are limited, you can also choose to submit the technical plan first. After

passing the technical plan, you can get the qualifications of the rental robot or more purchasing discounts. For details of the robot rental, please refer to the announcement of the robot rental announcement which will be published shortly afterwards.

1、对于新队伍，经费有限，如何参加比赛？

答：报名通过，参赛选手即可以最低 8 折购买机器人平台。如果经费有限，也可以选择先提交技术方案，通过技术方案后，可以获得租赁机器人的资格或更多优惠，租赁方面细节，详见之后公布的机器人租赁公告。

2. Can you buy only the mechanical structure of an AI robot?

A: No.

2、能不能仅购买 AI 机器人的机械结构？

答：不能。

3. Where can I check the purchase discount of the participating teams?

A: See the official website-announcement-ICRA 2019 RoboMaster AI Challenge material purchase announcement.

3、参赛队伍的购买优惠可以在哪里查看？

答：详见官网-公告-ICRA 2019 RoboMaster 人工智能挑战赛物资购买公告。

4. What is the AI robot rental price?

A: For details of the lease, please refer to the announcement of the robot rental announcement which will be published shortly afterwards.

4、AI 机器人租赁价格为多少？

答：租赁方面细节，详见之后公布的机器人租赁公告。

5. After buying a robot, can you purchase the goods in an unlimited amount with 40% off discount?

A: No. The purchase limit and purchase list can be found in the official website-announcement-ICRA 2019 RoboMaster AI Challenge material purchase announcement.

5、买了机器人后，可以无限量以 6 折购买物资吗？

答：不能。购买上限和购买清单，详见官网-公告-ICRA 2019 RoboMaster 人工智能挑战赛物资购买公告。

6. Do we have to select and buy lidar and camera by ourselves?

A: Yes. The committee provides the basic method. The sensor and computing devices are selected by your own.

6、激光雷达和摄像头需要自己在市场上采购吗？

答：组委会提供的是基本方案，传感器和计算设备需要大家自由选取。

7. If I rent an ICRA robot, can I modify the hardware?

A: Modifications are made in accordance with ICRA inspection standards. When returning, it is necessary to ensure the integrity of the robot. We will perform a damage check on the robot and deduct the necessary expenses according to the contract.

7、如果租赁 ICRA 机器人，是否不能对硬件进行改装？

答：按照 ICRA 检录标准进行改装。归还的时候，需要保证机器人的完整性，我们会对机器人进行定损检查，按照合同约定扣除必要的费用。

8. Does the UWB module have a need for purchase?

A: Purchase according to the needs of each team.

8. UWB 模块有购买的需要吗？

答：根据每个队伍的需要自行购买。

9. Must I buy Manifold2? Can we use Jetson TX2?

A: Yes, the official does not limit computing equipment.

9. 一定要购买 Manifold2 吗？我们用 Jetson TX2 可以吗？

答：都可以，官方不限制计算设备。

10. How long does it take to ship a robot?

A: About 1 week.

10. 购买机器人，运输时间需要多久？

答：大约 1 个星期。

11. How much does it cost to rent a robot? Is the late deposit refunded to the original account?

A: The rental announcement is subject to: <https://www.robomaster.com/en-US/resource/pages/995?type=announcementSub>

11. 请问租赁机器人要花多少钱？后期押金是退回原账户吗？

答：以租赁公告为准：<https://www.robomaster.com/en-US/resource/pages/995?type=announcementSub>

12. Is there a download line for the development board in the wire package of the AI robot? Is there a connection between the referee system and the STM32 serial port?

A: No. The programming line needs to purchase the swd 4pin line to connect to the downloader. The referee system and the STM32 serial cable also need to be made or purchased.

12. AI 机器人的线材包里有开发板的下载线吗？有裁判系统与 STM32 串口的连接线吗？

答：没有。烧写线需要自行购买 swd 4pin 线连接对应下载器下载程序，裁判系统与 STM32 串口线也需要自行制作或者购买。

13. What is the use of the single-axis imu on that site? Can it be used normally without plugging?

A: Provide an absolute chassis angle to the upper layer. Recommended for plug-in use, robot navigation depends on the module angle and angular velocity information.

13. 话说那个地盘上的单轴 imu 有什么用？不插能正常使用吗？

答：给上层提供绝对底盘角度。推荐插上使用，机器人导航高度依赖该模块角度和角速度信息。

About robots:

关于机器人:

1. Can we use the robots of last year?

A: You can use the official robot purchased last year, but you need to re-purchase the new version of the 2019 referee system and meet the screening criteria to participate.

Since the performance problems and overall stability of the old chassis are quite different from those of the new version of the robot, the risk of the game is borne by the team. In addition,

since the old version of the gimbal motor and the chassis motor have been discontinued, the organizing committee does not provide relevant purchase and after-sales service, and no longer maintain the hardware and software of the old official robot.

1、比赛可以用去年的机器人吗？

答：可以使用去年购买的官方机器人，但是，需要重新购买 2019 新版的裁判系统且符合检录标准才能参赛。由于旧版底盘性能问题和整体稳定性与新版本机器人差别比较大，因此带来的比赛风险由队伍自行承担；另外，由于旧版的云台电机和底盘电机已经停产，官方渠道不提供相关购买和售后服务，且不再维护旧版官方机器人的硬软件。

2. Can an AI robot only be used for one year? Can I reuse it after participating in the competition?

A: No, this year's modular design is designed to make modular iterations based on this platform in the future. For example, you can replace the development board, replace the power module, etc., and do not redo the whole machine, so the service life is not One year.

2、AI 机器人只能使用一年吗？以后参加比赛能否复用？

答：不是，今年开始模块化设计，是为了今后比赛都尽可能基于这个平台模块化迭代，例如可选更换开发板，可选更换动力模块等，并不会整机重做，所以使用年限非一年。

3. Does the AI robot include Manifold2, lidar and camera?

A: Not included. The complete machine contains modules as shown in the list of lists.

3、AI 机器人包含 Manifold2，激光雷达和相机吗？

答：不包含。整机包含模块参见列表清单。

4. Is the referee system of the AI robot and the 2019 referee system of the RM competition the same version?

A: The AI robot's referee system does not have a top armour board, no picture transmission module and UWB module.

4、AI 机器人的裁判系统和 RM 大赛的 19 年裁判系统是同一版吗？

答：AI 机器人的裁判系统没有上装甲板、没有图传和 UWB 模块。

5. Is the AI robot only used for competition?

A: The entire platform can not only serve the game, but also can be used as a universal mobile robot platform with strong compatibility and modularity. The chassis module and the gimbal module can be separately debugged and used. At the same time, multiple sensor mounting holes are provided, and various types of sensors such as laser radar, RGBD camera and industrial camera can be installed. In terms of the computing device, the platform is compatible with certain size limits. Common onboard computers such as Manifold, Manifold2, and Intel NUC, size cap Nvidia Xavier, officially support Manifold2 based on Nvidia Jetson TX2.

5、AI 机器人只有比赛用途吗？

答：整个平台不是仅仅可以为比赛服务，同时可以作为一个普适的移动机器人平台，拥有比较强的兼容性和模块化特点。底盘模块和云台模块是可以分离调试和使用的，同时提供了多个传感器安装孔位，可以安装激光雷达，RGBD 相机，工业相机等多种类型传感器。计算设备方面，兼容一定尺寸限制的计算机设备，常见的板载电脑例如 Manifold、Manifold2 和 Intel NUC，尺寸上限 Nvidia Xavier，官方支持的是基于 Nvidia Jetson TX2 的 Manifold2。

6. Can AI robots participate in the RM2019?

A: Yes, but the robot needs to be guaranteed to meet the inspection specifications of the RM2019.

6、AI 机器人可以参加 RM2019 机甲大师赛吗？

答：可以，但机器人需要保证符合 RM2019 机甲大师赛的检录规范。

7. AI robot price is too high, why is the price so high?

A: The price of the robot is mainly due to the high modularity and performance requirements of this year's robot. Therefore, the cost of the new version of the modular referee system is also high. Therefore, the rental and program screening coupons were introduced according to the previous questionnaire. At the stage, we hope to encourage the team that really has the strength and energy to enter the competition to register.

7、AI 机器人售价太高了，为什么定价如此高？

答：关于机器人价格问题主要是今年的车因为模块化和性能要求比较高，所以整机附带新版模块化裁判系统后的成本也很高，因此根据之前的问卷才推出了租赁和方案筛选优惠券的阶段，希望鼓励真正有实力和精力投入比赛的队伍踊跃报名。

8. If we are using the ICRA 2018 RM AI Challenge robot which have been modified, what are the requirements? (2019.1.8)?

A: The robot modification needs to comply with the referee system installation specification and the competition inspection specification. What needs special explanation is:

- (1) All-directional shooting mechanism is forbidden;
- (2) Due to the power of robot is not limited, it is forbidden to modify or add other drive mechanisms, such as using the unofficial motors to replace the official ones or using non-motor solutions to greatly improve sports performance. Allow 2018 version of the robots to upgrade their motors to the latest generation RoboMaster motor;
- (3) Adding or modifying mechanisms which interfere others' competition is forbidden;
- (4) Adding or modifying mechanisms that cause safety hazards is forbidden

If you still have some questions in robot modification, you need to ask the official in advance. The final interpretation is owned by the official.

8、如果使用 ICRA 2018 RM AI Challenge 的机器人，因为有改装过，如何保证满足 2019 年比赛的要求？(2019.1.8)

答：机器人改装需要符合裁判系统安装规范和比赛检录规范，需要特别说明的是：

- (1) 禁止改装全向射击；
- (2) 由于功率不限制，禁止改装或增加其他驱动机构，例如更换非官方电机或采用非电机方案大幅提升运动性能等。允许 2018 版本机器人升级迭代 RoboMaster 官方新一代电机；
- (3) 禁止增加或改装干扰他人比赛的装置机构；
- (4) 禁止增加导致安全隐患的装置机构。

如果有不确定的改装需求需提前向官方询问，最终解释权归官方所有。

9. Is it allowed to modify and adjust some other mechanical structures of the robot, except the ammunition magazine. For example, suspension and motor parts. (2019.1.8)

A: The 2019 AI Challenge is a game that focuses on robotic algorithms. The robots are not required to move in irregular terrain. Therefore, in order to ensure the fairness of the game, the rule only allows the sensors connection structures and ammunition magazine to be modified and adjusted. See detailed answer in question 8.

9、AI 机器人的机械结构除了取弹仓能够改动，其他部位能做调整吗？比如说悬挂与电机等部分。(2019.1.8)

答：2019 年 AI 挑战赛是偏向机器人算法的比赛，机器人没有不规则地形运动需求，因此，为了保证比赛公平，规则只允许为了搭载传感器而对于整机连接件的改装，补给子弹的弹仓部分的改装。其他见问题 8。

10. When will be the release date for the 3D CAD drawings for AI robots?

A: In mid-January 2019

10、请问 AI 机器人的三维图纸将于什么时候发布？(2019.1.8)

答：2019 年 1 月中旬。

11. Whether it is allowed to use the quadrature encoder?

A: Yes. As long as the installation complies with the modification specifications and inspection specifications. Quadrature encoder can only replace the data of motor encoder, in order to obtain more accurate odometry information. It is noticeable that the AI robot must have the ability to actively sense the surrounding environment and have a collision-avoidance motion planning, thus it is also necessary to use sensors that sense obstacles, such as depth cameras or Lidar, etc. Any robots that sense the obstacles through collision is not allowed, therefore the teams need to indicate their technical solutions in the technical reports.

11、允许正交码盘使用吗？

答：允许，安装需要符合改装规范和检录规范。正交码盘一般只能替代电机编码器而获得更准确的里程计信息，使用需要注意的是，比赛机器人必须具备主动感知的能力，因此还需要感知障碍物的传感器搭配使用，例如深度相机或者激光雷达等，任何通过碰撞感知障碍物的机器人都不能上场比赛，因此参赛队需要在技术报告中指出相应的技术方案。

12. UWB's angle information is not accurate. Is this normal?

A: The angle information of UWB is a pure geomagnetic meter, which is a normal phenomenon.

12. UWB 的角度信息不准，这是正常的吗？

答：UWB 的角度信息是纯地磁计，属于正常现象。

13. UWB does not take the referee system directly connected to the CAN port, which means that UWB is directly connected to the host computer?

A: It can be connected to the STM32 MCU. (Uwb, single-axis gyroscope, communication can2 hardware use a can, regardless of the wiring order)

13. UWB 不走裁判系统直接接在 CAN 口，意思是指 UWB 直接接在上位机对吗？

答：可以接在 STM32 MCU 上。（uwb、单轴陀螺仪、通信 can2 硬件上使用一个 can，无需考虑接线顺序）

14. Can I install a laptop on my robot or leave my laptop on the field to provide power to the car?

A: You can do calculations in the off-site operation area. During the game, you are not allowed to operate. For details, refer to the rules manual. Communication delays and other wireless interferences on the site need to be evaluated by the team.

14. 能否在机器人上装笔记本电脑，或将笔记本电脑放在场外给小车提供算力？

答：可以在场外操作区域做运算，比赛期间不准人为操作，具体参照规则手册，通信延迟和现场其他的无线干扰需要参赛队自行评估。

15. Does the host computer connect the lower computer to control the chassis movement, in addition to the port of the remote control, is there any other port? Is there a dedicated interface for control?

A: USB. RoboRTS is the official open source upper framework, where the robots_base_node node is the node responsible for communicating with the underlying STM32 MCU, specifically the USB virtual serial communication.

15. 请问上位机连接下位机控制底盘移动，除了遥控器的端口是否还有其他端口呢？有没有专门的接口用于控制？

答：USB。RoboRTS 是官方开源的上层框架，其中 robots_base_node 节点是负责与下层 STM32 MCU 通信的节点，具体是 USB 虚拟串口通信。

16. Does the "Camera" below mean image transmission module or our own camera?



A: The image transmission module. The new referee system defaults to the standard match configuration, so the armor4, camera, and locator modules are missing errors in the current

firmware and offline mode, which is normal. This issue will be resolved after updating the AI Challenge server firmware.

16、这里的 camera 模块是指图传模块，还是我们自己的相机？



答：图传模块。新的裁判系统默认是标准比赛配置，因此在当前固件和离线模式下会出现 armor4、camera 和 locator 模块缺失报错，这是正常现象。之后更新 AI 挑战赛服务器固件后会解决此问题。

17. What is the use of the power port on the front of the robot?

A: The power connector can replace the battery under uninterrupted power. An external battery is required to be taken, and the battery without electricity is removed.

17、机器人前面的电源口有什么用处？

答：电源接口，可以在不断电的情况下更换电池。需要外接一个开启的电池，把车上没有电的电池取下来。

18. When will the configuration report generated by Stm32cubemx be open source?

A: There is currently no actual configuration report, because some of the hal configuration is derived from last year's program, slightly modified. In addition to the limit switch replaced by a pin, the configuration is basically the same as last year. For details, please refer to <https://github.com/RoboMaster/RoboRTS-Firmware/tree/icra2019/config>

18、请问下 Stm32cubemx 生成的配置报告大概什么时候能开源？

答：目前没有实际的配置报告，因为一部分 hal 配置是来源于去年程序，略加修改而得到的。除了限位开关换了一个引脚，配置和去年基本相同。具体参考 <https://github.com/RoboMaster/RoboRTS-Firmware/tree/icra2019/config>

19. Do you need to set the function enable mask to offline when debugging?

A: You can set this up so that you can debug the robot in offline mode (set the robot's blood volume and other information, you can also get robot-related information), no server. After the server firmware is updated, you can get information about the game and the venue when making decisions.

19、调试时需要把 function enable mask 设置成 offline 吗？

答：可以这样设置，这样设置可以离线模式下调试机器人（设置机器人的血量等等信息，也可以获得机器人相关的信息），不需要服务器。后期服务器固件更新后，做决策的时候再加上就可以获取比赛和场地的相关信息。

20. Does the official robot's friction wheel opened loop or closed loop?

A: Opened loop.

20、请问官方机器人的摩擦轮是开环还是闭环？

答：开环。

21. Can the TX2 be directly connected to the battery? Still only from the referee system power module?

A: According to the TX2 carrier input voltage, if you do not meet the 24V input, it is recommended to buy a DC-DC step-down module (note the maximum current limit).

21、请问 TX2 可以直接和电池连接吗？还是只能从裁判系统电源模块接出来？

答：根据 TX2 载板输入电压决定，如果不符合 24V 输入建议买个 DC-DC 降压的模块（注意最大电流限制）。

22、After updating referee system firmware, there is a continuous beep for the STM32 board. And I can not control the robot using RC. What is the problem?

After updating referee system firmware, offline mode must be set for referee system when the referee system is disconnected to the game server, or the gimbal and chassis module will not be powered. If the problem still remains, please refer to

<https://github.com/RoboMaster/RoboRTS-Firmware/blob/icra2019/doc/en/readme.md> to check actuator module offline.

22、请问机器人在升级裁判系统后，开发板发出响声，无法遥控是什么问题？

答：更新裁判系统固件后，裁判系统主控必须进入 offline 模式或者连接裁判系统服务器才可以给底盘和云台模块供电。如果问题仍然存在，请参考 <https://github.com/RoboMaster/RoboRTS-Firmware> 检查各个驱动模块的离线情况。

About the registration stage:

关于报名阶段:

1. At present, my registration has passed. What should I prepare?

A: Pay attention to the following time, and prepare for the competition according to the preparation process of the registration system.

From now on - 1.18 registration

From now on -1.10 The first materials purchase order

From now on -1.22 technical proposal submission (optional)

1、目前我报名通过了，我应该准备什么？

答：留意以下时间，按照报名系统的备赛环节进行准备比赛。

即日起-1.18 报名

即日起-1.10 第一批物资购买

即日起-1.22 技术方案提交（可选）

2. By signing up, can we rent a robot now?

A: No. The robot can only be rented after the technical proposal.

2、通过报名了，我现在能租赁机器人吗？

答：不能。只有通过技术方案后，才能租赁机器人。

3. Can I buy a robot after signing up not in the name of a university?

A: Yes. For detailed purchase process, please refer to the official website-announcement-ICRA 2019 RoboMaster AI Challenge material purchase announcement.

3、以非学校的名义，报名通过后我能购买机器人吗？

答：可以。详细购买流程请见官网-公告-ICRA 2019 RoboMaster 人工智能挑战赛物资购买公告。

4. How long does it take to verify the competition registration?

A: 2-5 days.

4、报名审核要多久时间？

答：2-5 天工作日。

5. Is the number of people in each group limited? There is no way to set more people in the same group in the system.

A: According to the rules of the number of people in the rules manual.

5. 每个组的人数是有限的吗？系统里没法把更多人设置到同一组了。

答：按照规则手册里面人数的规定。

6. Where is the united team statement and Support Letter downloaded?

A: Registration system page.

6. 联队声明函、Support Letter 在哪里下载？

答：报名系统页面。

About learning and open source materials:

关于学习和开源资料:

1. Does the official have open source information for the simulator?

A: The new Simulation module will not be provided in the new season. Only the ROS-based Stage will be used in the open source framework to simulate the robot environment. The simulators for training and learning are still under development. Welcome to join our discussion.

1、官方是否有做模拟器的开源资料？

答：新赛季中官方不会提供新的 Simulation 模块，只会在开源框架中配套基于 ROS 的 Stage 来仿真机器人环境，关于训练和学习部分的模拟器仍在研发中，欢迎大家交流讨论。

2. For the first time, do you have any study materials?

A: The DJI engineer, Li, wrote a tutorial for 2019 competition. Everyone can refer to relevant theoretical knowledge to learn.

English version:

https://www.reddit.com/r/ROBOMASTER/comments/9m31qb/an_introduction_from_robomaster_ai_challenge_to/

Chinese version: <https://zhuanlan.zhihu.com/p/44117460>

Because of last year's general feedback that the development of the official platform is more difficult, we will open source related 3D STEP drawings, the underlying embedded source code and the upper-level RoboRTS framework source code based on ROS package. The modularization of the entire hardware platform, as well as the better decoupling interface and functional modules of the entire system software part, the team members can better focus on the development of their own modules. At the same time, the supporting technical documentation, text and video tutorials have been improved.

2、第一次参加，有学习资料吗？

答：之前大疆工程师 Li 写过一篇 2019 年的参赛攻略，大家可以参考相关理论知识进行学习。

英文版：

https://www.reddit.com/r/ROBOMASTER/comments/9m31qb/an_introduction_from_robomaster_ai_challenge_to/

中文版：<https://zhuanlan.zhihu.com/p/44117460>

由于去年大家普遍反应官方平台上开发比较困难，我们新赛季将开源相关三维 STEP 图纸，底层嵌入式源码以及基于 ROS 包的上层 RoboRTS 框架源码。整个硬件平台的模块化，以及整个系统软件部分更好的解耦接口和功能模块，队员可以更好的专注于自己模块的开发。同时完善了配套的技术说明文档，文字与视频使用教程。

3. Does the ICRA2019 robot have SolidWorks drawings?

A: Yes. See: <https://www.robomaster.com/en-US/resource/pages/998?type=announcementSub>

3. ICRA2019 机器人有 SolidWorks 图纸吗？

答：有。详见：<https://www.robomaster.com/en-US/resource/pages/998?type=announcementSub>

4. Is the embedded firmware compatible with the communication protocol student interface of the old referee system?

A: Incompatible, the related RoboRTS and RoboRTS-Firmware hosted on Github only support and maintain the new version of the referee system and the robot platform released this year.

4. 嵌入式的固件是否兼容旧版裁判系统的通信协议学生接口？

答：不兼容，托管在 Github 上的相关 RoboRTS 和 RoboRTS-Firmware 只支持和维护新版裁判系统与今年发售的机器人平台。

About the referee system:

关于裁判系统:

1. If it is possible to get the enemy information through the referee system during the game? (2019.1.8)

A: No, the enemy's information cannot be obtained through the referee system during the game.

1、比赛时是否可以通过裁判系统获取敌方的信息？（2019.1.8）

答：不可以，比赛时敌方的信息无法通过裁判系统获取。

2. When can I get the referee system?

A: April.

2、几时可以拿到裁判系统？

答：4 月份。

3. The referee system uses USB to connect to the computer. At this time, the firmware upgrade shows that the upgrade failed. What is the reason?

A: The referee system is upgraded, and the computer can be upgraded directly when connected to the Internet (<https://m.robomaster.com/zh-CN/products/components/referee>)

Download the robomaster tool 2 on the official website referee system page. The new and old referee system upgrade tools are not universal.

3、请问裁判系统用 USB 连接电脑，此时固件升级显示升级失败是什么原因？

答：裁判系统升级，电脑连上网就可以直接升级(<https://m.robomaster.com/zh-CN/products/components/referee>)

在官网裁判系统页面下载 robomaster tool 2，新旧裁判系统升级工具不通用。

4. Do the referee system have to buy a new one? Can the old use?

A: Teams must purchase a new referee system to participate in the competition.

4、裁判系统一定要购买新的吗？旧的能否使用？

答：参赛队伍一定要购买新的裁判系统才能参加比赛。

About Final Admission

关于最终参赛资格：

1. How many teams can actually go to the live game?

A: About 20 teams.

1. 最终有多少个队伍可以去现场比赛？

答：约 20 支队伍。

2. Will the official sponsor this year's ICRA show tickets for the final team?

A: No. You do not need to purchase ICRA tickets for this year's competition. If the team needs to enter the main venue, they need to purchase it themselves.

2. 今年官方会赞助给最终参赛的队伍 ICRA 展会门票吗？

答：不会。今年参加比赛不需要购买 ICRA 展会门票，如果队伍需要进入主会场，需要自行购买。

About Sponsors

关于赞助商：

1. Can the ICRA team find sponsors? Need to sign an agreement with the organizing committee?

A: You can find a sponsor. If you need support, you can contact robomaster@dji.com.

1. ICRA 比赛队伍可以找赞助商吗？需要跟组委会签订协议吗？

答：可以找赞助商，[需要支持可以联系 robomaster@dji.com](mailto:robomaster@dji.com)