100 Rules for Project Managers, by NASA

Over the years, I've seen these rules on different sites, sometimes quoted selectively, sometimes embellished, sometimes with more than 100. I like these rules. They're not exhaustive, but they are sensible. Some are more relevant to my work than others are, and I'm sure you'll find the same

NASA is a mature organisation, in project management terms. People there know how to approach projects. They acknowledge that mistakes are still made, but a measure of their maturity is that they capture learnings from mistakes.

I've checked, and I don't believe these rules are under copyright, but I'm always happy to accredit sources anyway. I hope you find them useful.

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The Project Manager

#1: A project manager should visit everyone who is building anything for his project at least once, should know all the managers on his project (government and contractor), and know the integration team members. People like to know that the project manager is interested in their work and the best proof is for the manager to visit them and see first hand what they are doing.
#2: A project manager must know what motivates the project contractors (i.e., their award system, their fiscal system, their policies, and their company culture).
#3: Management principles still are the same. It is just that the tools have changed. You still find the right people to do the work and get out of the way so they can do it.
#4: Whoever you deal with, deal fairly. You may be surprised how often you have to work with the same people. Better they respect you than carry a grudge.
#5: Vicious, despicable, or thoroughly disliked persons, gentlemen, and ladies can be project managers. Lost souls, procrastinators, and wishy-washies cannot.
#6: A comfortable project manager is one waiting for his next assignment or one on the verge of failure. Security is not normal to project management.
#7: One problem new managers face is that everyone wants to solve their problems. Old managers were told by senior management—"solve your own darn problems, that is what we hired you to do."
#8: Running fast does not take the place of thinking for yourself. You must take time to smell the roses. For your work, you must take time to understand the consequences of your actions.
#9: The boss may not know how to do the work but he has to know what he wants. The boss had better find out what he expects and wants if he doesn't know. A blind leader tends to go in circles.
#10: Not all successful managers are competent and not all failed managers are incompetent. Luck still plays a part in success or failure but luck favors the competent hard working manager.
#11: Never try to get even for some slight by anyone on the project. It is not good form and it puts you on the same level as the other person and, besides, probably ends up hurting the project getting done.
#12: Don't get too egotistical so that you can't change your position, especially if your personnel tell you that you are wrong. You should cultivate an attitude on the project where your personnel know they can tell you of wrong decisions.
#13: A manager who is his own systems engineer or financial manager is one who will probably try to do open heart surgery on himself.
#14: Most managers succeed on the strength and skill of their staff.

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Initial Work

#15: The seeds of problems are laid down early. Initial planning is the most vital part of a project. The review of most failed projects or project problems indicate the disasters were well planned to happen from the start.

Communications

#16: Cooperative efforts require good communications and early warning systems. A project manager should try to keep his partners aware of what is going on and should be the one who tells them first of any rumor or actual changes in plan. The partners should be consulted before things are put in final form, even if they only have a small piece of the action. A project manager who blindsides his partners will be treated in kind and will be considered a person of no integrity.
#17: Talk is not cheap; but the best way to understand a personnel or technical problem is to talk to the right people. Lack of talk at the right levels is deadly.
#18: Most international meetings are held in English. This is a foreign language to most participants such as Americans, Germans, Italians, etc. It is important to have adequate discussions so that there are no misinterpretations of what is said.
#19: You cannot be ignorant of the language of the area you manage or with that of areas with which you interface. Education is a must for the modern manager. There are simple courses available to learn computerese, communicationese and all the rest of the modern "ese's" of the world. You can't manage if you don't understand what is being said or written.

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People

#20: You cannot watch everything. What you can watch is the people. They have to know you will not accept a poor job.
#21: We have developed a set of people whose self interest is more paramount than the work or at least it appears so to older managers. It appears to the older managers that the newer ones are more interested in form than in substance. The question is are old managers right or just old? Consider both viewpoints.
#22: A good technician, quality inspector, and straw boss are more important in obtaining a good product than all the paper and reviews.
#23: The source of most problems is people, but darned if they will admit it. Know the people working on your project to know what the real weak spots are.
#24: One must pay close attention to workaholics—if they get going in the wrong direction, they can do a lot of damage in a short time. It is possible to overload them and cause premature burnout but hard to determine if the load is too much, since much of it is self generated. It is important to make sure such people take enough time off and that the workload does not exceed 1 1/4 to 1 1/2 times what is normal.
#25: Always try to negotiate your internal support at the lowest level. What you want is the support of the person doing the work, and the closer you can get to him in negotiations the better.
#26: If you have someone who doesn't look, ask, and analyze; ask them to transfer.
#27: Personal time is very important. You must be careful as a manager that you realize the value of other people's time (i.e., the work you hand out and meetings should be necessary). You must, where possible, shield your staff from unnecessary work (i.e., some requests should be ignored or a refusal sent to the requestor).
#28: People who monitor work and don't help get it done never seem to know exactly what is going on (being involved is the key to excellence).
#29: There is no greater motivation than giving a good person his piece of the puzzle to control, but a pat on the back or an award helps.
#30: It is mainly the incompetent that don't like to show off their work.
#31: There are rare times when only one man can do the job. These are in technical areas that are more art and skill than normal. Cherish these people, but get their work done as soon as possible. Getting the work done by someone else takes two or three times longer and the product is normally below standard.
#32: People have reasons for doing things the way they do them. Most people want to do a good job and, if they don't, the problem is they probably don't know how or exactly what is expected.
#33: If you have a problem that requires additional people to solve, you should approach putting people on like a cook who has under-salted the food.

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Reviews and Reports

#34: NASA has established a set of reviewers and a set of reviews. Once firmly established, the system will fight to stay alive, so make the most of it. Try to find a way for the reviews to work for you.
#35: The number of reviews is increasing but the knowledge transfer remains the same; therefore, all your charts and presentation material should be constructed with this fact in mind. This means you should be able to construct a set of slides that only needs to be shuffled from presentation to presentation.
#36: Hide nothing from the reviewers. Their reputation and yours is on the line. Expose all the warts and pimples. Don't offer excuses—just state facts.
#37: External reviews are scheduled at the worst possible time, therefore, keep an up-to-date set of business and technical data so that you can rapidly respond. Not having up-to-date data should be cause for dismissal.
#38: Never undercut your staff in public (i.e., In public meetings, don't reverse decisions on work that you have given them to do). Even if you direct a change, never take the responsibility for implementing away from your staff.
#39: Reviews are for the reviewed an not the reviewer. The review is a failure if the reviewed learn nothing from it.
#40: A working meeting has about six people attending. Meetings larger than this are for information transfer (management science has shown that, in a group greater than twelve, some are wasting their time).
#41: The amount of reviews and reports are proportional to management's understanding (i.e., the less management knows or understands the activities, the more they require reviews and reports). It is necessary in this type of environment to make sure that data is presented so that the average person, slightly familiar with activities, can understand it. Keeping the data simple and clear never insults anyone's intelligence.
#42: Managers who rely only on the paperwork to do the reporting of activities are known failures.
#43: Documentation does not take the place of knowledge. There is a great difference in what is supposed to be, what is thought to have happened, and reality. Documents are normally a static picture in time that get outdated rapidly.
#44: Just because you give monthly reports, don't think that you can abbreviate anything in a yearly report. If management understood the monthlies, they wouldn't need a yearly.
#45: Abbreviations are getting to be a pain. Each project now has a few thousand. This calls on senior management to know hundreds. Use them sparingly in presentations unless your objective is to confuse.
#46: Remember, it is often easier to do foolish paperwork that to fight the need for it. Fight only if it is a global issue which will save much future work.

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Contractors and Contracting

#47: A project manager is not the monitor of the contractor's work but is to be the driver. In award fee situations, the government personnel should be making every effort possible to make sure the contractor gets a high score (i.e., be on schedule and produce good work). Contractors don't fail, NASA does and that is why one must be proactive in support. This is also why a low score damages the government project manager as much as the contractor's manager because it means that he is not getting the job done.
#48: Award fee is a good tool that puts discipline both on the contractor and the government. The score given represents the status of the project as well as the management skills of both parties. The project management measurement system (PMS) should be used to verify the scores. Consistent poor scores require senior management intervention to determine the reason. Consistent good scores which are consistent with PMS reflect a well-run project, but if these scores are not consistent with the PMS, senior management must take action to find out why.
#49: Morale of the contractor's personnel is important to a government manager. Just as you don't want to buy a car built by disgruntled employees, you don't want to buy flight hardware developed by under- motivated people. You should take an active role in motivating all personnel on the project.
#50: Being friendly with a contractor is fine—being a friend of a contractor is dangerous to your objectivity.
#51: Remember, your contractor has a tendency to have a one-on-one interface with your staff. Every member of your staff costs you at least one person on the contract per year.
#52: Contractors tend to size up the government counterparts and staff their part of the project accordingly. If they think yours are clunkers, they will take their poorer people to put on your project.
#53: Contractors respond well to the customer that pays attention to what they are doing but not too well to the customer that continually second-guesses their activity. The basic rule is a customer is always right but the cost will escalate if a customer always has things done his way instead of how the contractor planned on doing it. The ground rule is: never change a contractor's plans unless they are flawed or too costly (i.e., the old saying that better is the enemy of good).
#54: There is only one solution to a weak project manager in industry—get rid of him fast. The main job of a project manager in industry is to keep the customer happy. Make sure the one working with you knows that it is not flattery but on-schedule, on-cost, and a good product that makes you happy.

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Engineers and Scientists

#55: Over-engineering is common. Engineers like puzzles and mazes. Try to make them keep their designs simple.
#56: The first sign of trouble comes from the schedule or the cost curve. Engineers are the last to know they are in trouble. Engineers are born optimists.
#57: The project has many resources within itself. There probably are five or ten system engineers considering all the contractors and instrument developers. This is a powerful resource that can be used to attack problems.
#58: Many managers, just because they have the scientists under contract on their project, forget that the scientists are their customers and many times have easier access to top management than the managers do.
#59: Most scientists are rational unless you endanger their chance to do their experiment. They will work with you if they believe you are telling them the truth. This includes reducing their own plans.

Hardware

#60: In the space business, there is no such thing as previously flown hardware. The people who build the next unit probably never saw the previous unit. There are probably minor changes (perhaps even major changes); the operational environment has probably changed; the people who check the unit out in most cases will not understand the unit or the test equipment.
#61: Most equipment works as built, not as the designer planned. This is due to layout of the design, poor understanding on the designer's part, or poor understanding of component specifications.

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Computers and Software

#62: Not using modern techniques, like computer systems, is a great mistake, but forgetting that the computer simulates thinking is a still greater mistake.
#63: Software has now taken on all the parameters of hardware (i.e., requirement creep, high percentage of flight mission cost, need for quality control, need for validation procedures, etc.). It has the added feature that it is hard as blazes to determine it is not flawed. Get the basic system working first and then add the bells and whistles. Never throw away a version that works even if you have all the confidence in the world that the newer version works. It is necessary to have contingency plans for software.
#64: Knowledge is often revised by simulations or testing, but computer models have hidden flaws not the least of which is poor input data.
#65: In olden times, engineers had hands-on experience, technicians understood how the electronics worked and what it was supposed to do, and layout technicians knew too—but today only the computer knows for sure and it's not talking.

Senior Management, Program Offices, and Above

#66: Don't assume you know why senior management has done something. If you feel you need to know, ask. You get some amazing answers that will astonish you.
#67: Know your management—some like a good joke, others only like a joke if they tell it.
#68: Remember the boss has the right to make decisions. Even if you think they are wrong, tell the boss what you think but if he still wants it done his way; do it his way and do your best to make sure the outcome is successful.
#69: Never ask management to make a decision that you can make. Assume you have the authority to make decisions unless you know there is a document that states unequivocally that you can't.
#70: You and the Program Manager should work as a team. The Program Manager is your advocate at NASA HQ and must be tied into the decision makers and should aid your efforts to be tied in also.
#71: Know who the decision makers on the program are. It may be someone outside who has the ear of Congress or the Administrator, or the Associate Administrator, or one of the scientists—someone in the chain of command—whoever they are. Try to get a line of communication to them on a formal or informal basis.

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Program Planning, Budgeting, and Estimating

#72: Today one must push the state of the art, be within budget, take risks, not fail, and be on time. Strangely, all these are consistent as long as the ground rules such as funding profile and schedule are established up front and maintained.
#73: Most of yesteryear's projects overran because of poor estimates and not because of mistakes. Getting better estimates will not lower costs but will improve NASA's business reputation. Actually, there is a high probability that getting better estimates will increase costs and assure a higher profit to industry unless the fee is reduced to reflect lower risk on the part of industry. A better reputation is necessary in the present environment.
#74: All problems are solvable in time, so make sure you have enough schedule contingency—if you don't, the next project manager that takes your place will.
#75: The old NASA pushed the limits of technology and science; therefore, it did not worry about requirements creep or overruns. The new NASA has to work as if all projects are fixed price; therefore, requirement creep has become a deadly sin.
#76: Know the resources of your center and, if possible, other centers. Other centers, if they have the resources , are normally happy to help. It is always surprising how much good help one can get by just asking.
#77: Other than budget information prior to the President's submittal to Congress, there is probably no secret information on a project—so don't treat anything like it is secret. Everyone does better if they can see the whole picture so don't hide any of it from anyone.
#78: NASA programs compete for budget funds—they do not compete with each other (i.e., you never attack any other program or NASA work with the idea that you should get their funding). Sell what you have on its own merit.
#79: Next year is always the year with adequate funding and schedule. Next year arrives on the 50th year of your career.

The Customer

#80: Remember who the customer is and what his objectives are (i.e., check with him when you go to change anything of significance).

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NASA Management Instructions

#81: NASA Management Instructions were written by another NASA employee like you; therefore, challenge them if they don't make sense. It is possible another NASA employee will rewrite them or waive them for you.

Decision Making

#82: Wrong decisions made early can be recovered from. Right decisions made late cannot correct them.
#83: Sometimes the best thing to do is nothing. It is also occasionally the best help you can give. Just listening is all that is needed on many occasions. You may be the boss, but if you constantly have to solve someone's problems, you are working for him.
#84: Never make a decision from a cartoon. Look at the actual hardware or what real information is available such as layouts. Too much time is wasted by people trying to cure a cartoon whose function is to explain the principle.

Professional Ethics and Integrity

#85: Integrity means your subordinates trust you.
#86: In the rush to get things done, it's always important to remember who you work for. Blindsiding the boss will not be to your benefit in the long run.

Project Management and Teamwork

#87: Projects require teamwork to succeed. Remember, most teams have a coach and not a boss, but the coach still has to call some of the plays.
#88: Never assume someone knows something or has done something unless you have asked them; even the obvious is overlooked or ignored on occasion, especially in a high stress activity.
#89: Whoever said beggars can't be choosers doesn't understand project management, although many times it is better to trust to luck than to get poor support.
#90: A puzzle is hard to discern from just one piece; so don't be surprised if team members deprived of information reach the wrong conclusion.
#91: Remember, the President, Congress, OMB, NASA HQ, senior center management, and your customers all have jobs to do. All you have to do is keep them all happy.

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Treating and Avoiding Failures

#92: In case of a failure:

- a) Make a timeline of events and include everything that is known.
- b) Put down known facts. Check every theory against them.
- c) Don't beat the data until it confesses (i.e., know when to stop trying to force-fit a scenario).
- d) Do not arrive at a conclusion too fast. Make sure any deviation from normal is explained. Remember the wrong conclusion is prologue to the next failure.
- e) Know when to stop.

#93: Things that fail are lessons learned for the future. Occasionally things go right: these are also lessons learned. Try to duplicate that which works.

#94: Mistakes are all right but failure is not. Failure is just a mistake you can't recover from; therefore, try to create contingency plans and alternate approaches for the items or plans that have high risk.

#95: History is prologue. There has not been a project yet that has not had a parts problem despite all the qualification and testing done on parts. Time and being prepared to react are the only safeguards.

#96: Experience may be fine but testing is better. Knowing something will work never takes the place of proving that it will.

#97: Don't be afraid to fail or you will not succeed, but always work at your skill to recover. Part of that skill is knowing who can help.

#98: One of the advantages of NASA in the early days was the fact that everyone knew that the facts we were absolutely sure of could be wrong.

#99: Redundancy in hardware can be a fiction. We are adept at building things to be identical so that if one fails, the other will also fail. Make sure all hardware is treated in a build as if it were one of a kind and needed for mission success.

#100: Never make excuses; instead, present plans of actions to be taken.