Tips from Controllers: Navigating the NAS

- Most of the time, the computer assigns the routing, not the controllers.
- 5000 new controllers have been hired in the last 5 years.
- Controllers generally don't have any knowledge of aircraft equipage.
 - Instead of the old "flight strips", controllers use "data tags", which don't include information about aircraft equipment.
 - If you want direct, specify "GPS Direct".
- When practicing approaches, find a quiet time or non-busy airport
 - If doing a full approach, tell the controller first
 - Advise prior to being cleared if you want to do the missed approach
 - However, you may still be assigned something else
- When going around class B or C airspace, expect a lower altitude than requested
- If requesting a weather deviation, and the initial vector provided isn't enough, *ask for further deviations*.
- Pilots should not be reluctant to ask for assistance.
- It is recommended to take a tour of the various ATC facilities.

Ditching and Water Survival Doug Ritter

- Ditching is useful for forced-landing in areas without any suitable land options
 - For example, US Air flight 1549
- Common myths about ditching
 - 1. It is dangerous
 - 88% of all ditchings end without fatalities
 - 92% are successful when eliminating post-egress casualties
 - 95% are successful when eliminating long distance over-water flights.
 - 2. High-wing or low-wing makes no significant difference
 - 3. 33% of all ditchings are due to fuel issues
- 3 Phases to ditching
 - 1. Ditching
 - 2. Egress
 - 3. Survival & rescue
- 1. Ditching
 - Recognize the emergency
 - Don't delay
 - Make "Mayday" call
 - Location, location ← Most important information to provide
 - If uncertain, provide GPS coordinates/etc
 - An accurate position is essential. The longer it takes to get to you, the larger the search area due to drifting.
 - Situation
 - Altitude, course, speed
 - Say intentions
 - Descent phase
 - Altitude = time (and better communications)
 - Two types:
 - Conventional ditching
 - Ballistic parachute
 - 1. Set up for best glide speed
 - OR minimum sink speed, if more time is needed
 - This is usually between stall and Vg
 - 2. At 1000 feet AGL, resume normal approach speed
 - This is the speed we're used to landing at

- 3. Prepare
 - Life vests
 - Recommend constant-wear vests
 - Airline style: cinch TIGHT, and tuck in straps so they don't get caught on anything.
 - Present a positive attitude to passengers
 - Discuss
 - Order of egress
 - Especially if there is only one door
 - Alternate egress, such as baggage door, windows, etc
 - Retrieval of survival equipment
 - Who gets it, how is it used
 - **Do not re-enter aircraft!** (reaching inside is OK)
 - Belts TIGHT
 - Aircraft will decelerate *rapidly*!
 - Have passengers re-fasten belts
 - Preparation
 - Remove and stow hazards
 - headsets, cables, baggage, etc
 - Leave shoes <u>ON</u>
 - Unless wearing high-heels, or no life vest
 - Wedge open or jettison doors
 - Except for gull-wing doors
 - Tip: lock the door handle after opening, to prevent it from locking closed
 - Take an anti-emetic (for motion sickness)
 - Don swim goggles or diving mask
- Landing Direction
 - Rivers: land with the current
 - Lakes: land into the wind
 - Ocean/large lakes: land with the swells & waves
 - Find calm water, if possible
 - Wind/waves Navy developed procedures
 - Wind calm/moderate
 - Ignore the wind, land with the swells
 - Wind 1/3 to $\frac{1}{2}$ of landing speed
 - Split the difference (wind vs swell direction)
 - \circ 1/2+ of landing speed
 - Land into the wind
 - Don't worry too much about *where* to land with the swells
 - Landing against the swells: Don't land into the face of the swell

• Aircraft Configuration

- A lower touchdown speed is the best
- Landing with power = a shallower approach (better)
- Landing without power = **AVOID A FULL-STALL LANDING**
- Keep wings level/parallel to water surface
- Landing attitude should be like a soft-field landing
- Wing configuration
 - Low-wing: no flaps, to less than 50% flaps
 - High-wing: maximum flaps (except for a Cessna 206/etc, where full flaps prevents the rear doors from opening)
- Gear UP
- <u>Landing</u>
 - Assume crash position NO SOONER than 1 minute before touchdown
 - Any longer time, and the passengers may look up...just as about to touch down
 - Expect a *RAPID* deceleration
 - Windscreen could cave in (so hold breath)
 - 3 Possibilities (one, two, or all three could happen)
 - Aircraft skips over the water
 - KEEP FLYING
 - Splash
 - Aircraft flips over
 - Rare, but possible

2. Egress

- Obstacles to exiting
 - Water coming in
 - Restraints
 - Life vest
 - Obstructions
 - Reduced visibility
- The average person can hold their breath for up to 39 seconds
 - However, it can be as little as 10 seconds, or as much as 2.5+ minutes
 - Panic reduces this by ½ to 2/3rds
 - Can carry an emergency breathing system, such as "Spare Air"
 - This requires training
 - Cold water gasp reflex
 - An <u>uncontrollable</u> exhalation upon *rapid* immersion in cold water

- Not an issue if immersion isn't rapid
- Starts in 77-degree water, fully developed by 50-degrees
- Don't panic, take no more than 3 deep breaths
- If in a high-wing aircraft or inverted, you need to wait for the pressure to equalize before opening the door
 - Purposely hasten flooding
- **DO NOT** release seat belts until fully ready and able to escape!
- Deliberate offset: use your legs as a reference point to unbuckle and open the door
 - ALWAYS maintain a *reference point*!
 - Reach low, search hig
- Exiting
 - *Pull* to exit aircraft, *don't* kick (may kick someone behind you trying to exit)
 - If stuck
 - Backup, rotate, and try again
 - Reach *above* for protection
 - If disoriented about up and down, inflate life vest
 - **BUT NOT** while still in the aircraft!
 - Exhale slowly
 - DO NOT INFLATE RAFT in the aircraft!
- 3. Survival and Rescue
 - Pull HARD to inflate the vest
 - Account for all crew and passengers
 - Cold water incapacitation
 - In water <40-degrees, only 5-10 minutes
 - Hypothermia is possible in any water temperature below the body temperature
 - Heat-loss locations
 - Neck, head, underarms, groin
 - [°] Get out of the water (e.g. into a raft, on aircraft if still floating)
 - Don't lose the raft
 - Attach it to the aircraft with the mooring line
 - The line WILL detach/break as the plane sinks
 - Release/cut the line when all passengers are in, unless the aircraft is still floating
 - Secure all equipment/supplies
 - Use caution with sharp items!

- Keep life vests on
- If you aren't drinking water, don't eat food!
- Avoiding sea life
 - Don't splash, stay still
 - No shiny / flashy objects
- Carry a water-proof phone bag (zip-lock bag doesn't count)
- ELTs don't work if the aircraft sinks
 - Get a PLB
 - Keep it attached to you
 - Recommended PLBs
 - McMurdo Fast Find
 - ACR SARLink/AquaLink
 - SPOT is not a PLB

- Keys to survival
 - Preparation
 - Don't give up

www.equipped.org/AOPA

Practical Tips for Flying GPS & WAAS-based Approaches Max Trescott

- Study between flights (with a PC trainer)
- WAAS approaches not technically precision, but effectively the same
- WAAS allows for GPS approaches at the alternate
 - LAAS will allow for Category III-type approaches
- Accurate to within 2-3 meters
- WAAS Limitations
 - ° Only available in the US, and parts of Canada and Mexico
 - Less than 100% availability
 - However, outages usually last for only a few seconds
- Garmin 430W/530W update approximately every 25 feet (at 90 knots)
- Types of approaches
 - LPV Offers the best minimums (down to 250 AGL, sometimes 200 AGL)
 - Distance counts *down* to the *threshold*, NOT the DA(H)
 - LNAV/VNAV Airliners only
 - LNAV Traditional GPS approach
 - If the signal accuracy isn't available for an LPV approach, the accuracy may still be good enough for an LNAV approach
 - LNAV+V Same as LNAV, but with computer-generated vertical guidance
 - Garmin invention; not an official approach type
- <u>Common issues</u>
 - Losing waypoints when selecting an approach with vectors
 - Don't have to select an approach with vectors
 - Recommend always loading an approach with an IAF (though you may be cleared direct to an IF)
 - This is good to verify location while being vectored
 - Downside: Might require more thought and an extra step of activating a leg on the approach
 - When to "Load" vs "Activate"
 - "Active" goes *drect* to the IAF
 - Recommend "Load"ing the approach first

- Autopilot 180-degree turns back to IAF while on the approach
 - This happens when the approach is activated while inside the IAF
 - Best thing to do in this case is just to disconnect the autopilot
- An approach never needs to be activated
 - Prepare early
 - When cleared, highlight the appropriate waypoint, and go direct to it
 - When being vectored, activate the leg that it looks like you'll intercept
- When the FAF waypoint leg is activated, the GPS computes the best available minimums
- When pressing the CDI button, be sure to recheck that the autopilot is in the correct mode
- Recommend activating the Approach mode of the autopilot only while on the FAF, to ensure a reasonable intercept angle
- LPV: +/- 15 meters
- LNAV(+V): +/- 45 meters
- If "SUSP" is displayed while inside the FAF: DO NOT press "OBS"!
- If the approach waypoints in the flight plan are shown after the airport, just highlight the appropriate waypoint and press "Direct"

Thinking Small to Avoid Big Mistakes Rod Machado

- Losing focus is a bad problem to have in the cockpit
- How safe we are is determined by the choices we make
- The brain can only consciously process 2.8 bits per second
- Multitasking in an aircraft is a myth
 - The other tasks need to be reflexive (i.e. they don't require thinking)
- <u>4 simple mistakes</u> (errors in behavior)
 - ° If you can explain why you did something stupid, you can prevent it
 - "Trigger" Actives a schema (e.g. seeing someone drinking water when you're thirsty)
 - "Schema" A behavior program (After finding a water fountain when thirsty, we automatically walk to the fountain without thinking about it)
 - Three ways to activate a schema
 - Environmental stimuli
 - Memory
 - An act of will
 - 1. Capture Error
 - The environment activates a schema that you wouldn't normally activate
 - Antidote: Get back to the moment before making any major conscious decision
 - Talking to yourself is a way to accomplish this
 - 2. Description Error
 - We describe something to ourselves in a manner that is too simple to think about
 - e.g. Taxiing to the wrong runway/taxiway because we didn't spend the time to think about our location
 - The more complex something is, the more time we need to think about it and avoid abstracting it
 - 3. Selection Error
 - Triggering the wrong schema because of an environmental condition
 - e.g. Making a gear-up landing after a go-around and raising the gear, then making a gear-up landing because we didn't perform a takeoff
 - 4. Activation Error
 - One schema is forgotten, or interfered with by another schema

- Ex) Walking by the trash compactor with a full plate, then getting distracted and emptying the plate into the trash compactor.
- The more critical the thing you're about to do, the more attention you need to give it
- If distracted, STOP before doing anything

Seeing Through the FAA's Eyes: <u>A Better Vision for Pilots</u> Van Nakagawara

- Pilot population over age 40
 - ° 1983: 40%
 - ° 2008: 64%
- Number of visual issues increasing in the pilot population
- Special considerations for aviation vision
 - hypoxia
 - low relative humidity
 - atmospheric conditions
 - glare, low light (a lot of glare from below)
 - vibration, G-forces
 - ° noise
 - display type variety (LED, CRT, LCD, digital, analog)
 - ° motion sickness / disorientation
 - Good vision mitigates these
- Sunglasses with light transmittance <15% reduce visual acuity and target detection
 - Don't get lenses too dark
 - Extra-dark lenses also reduce color perception
- Change in lens types (bifocal, trifocal, etc) affects peripheral vision & depth perception
 - Recommend flying in the sim / with a safety pilot after getting a new lens type
- The pilot's view (distances) are different than an optometrist usually checks for
 - 30+" to the instrument panel
 - 20-30" to charts/etc
- Recommend measuring distances to charts, instrument panels, etc in the cockpit, and having your eye doctor test to those lengths
- Smaller bifocals are generally better, except for aircraft with wide instrument panels
- The typical trifocal intermediate segment may be too small
- Progressive lenses need to be specially designed for the individual, to avoid the distortion area of the lens
 - Long-corridor vs short-corridor is a personal preference
- Free-form lenses are a great choice, but are expensive
- Wavefront lenses: elimination of higher-order aberrations corrects light glare/halos at night

- Contact lenses
 - Only 3.5% of pilots use them
 - Glare can be a problem (using good sunglasses helps)
 - Agricultural pilots: soft lenses by absorb chemicals
 - Aerobatic pilots: hard lenses may fall out
 - Monovision contacts are not allowed by FAA regulations
 - Opaque/translucent lenses by affect peripheral vision
 - Bifocal/multifocal lenses are now allowed
 - Individual thing doesn't work for everyone
 - Can take a while to get the prescription right
- Photo-sensitive sunglasses are not suitable for aviation
- "Blue-blockers" or "yellow shooters" are unsuitable for aviation due to their distortion of colors
- Ideal aviation sunglasses
 - 100% UV protection
 - 70-85% reduction in light
 - Neutral gray color
 - Non-polarized
- Refractive surgery is getting better, and many GA and professional pilots have used it, but not the best option
- Cataract surgery is allowed, and can even be approved by an AME
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Real-World IFR JJ Greenway

• <u>Preflight</u>

- Easy items to forget
 - VOR check (preceding 30 days, log: who, when, where, how much)
 - GPS database
 - Terrain / Obstacle database not required
- Takeoff alternate
 - Will weather allow immediate return?
 - Or is a suitable alternate no more than 10-15 minutes away?
- Destination alternate
 - Suitable weather information: METARs, FAs, TAFs, PIREPs
 - Other reasons to use an alternate besides weather
 - Wind (unforeseen headwind, crosswind limit exceeded)
 - Airport closures
- <u>Departure</u>
 - Zero-zero takeoffs
 - Made safer by presence of runway lights, center-line lighting, center-line markings)
 - SIDs
 - Keeps airplanes out of where they should be (noise abatement, parallel runways, etc)
 - ODPs
 - Keeps airplanes from hitting land
 - Only <u>need</u> to fly if instructed
 - Notify ATC if you intend to fly
 - Useful to verify single-engine climb out
- Enroute
 - <u>Readbacks</u>
 - How much?
 - As much as necessary, as little as practical
 - Cockpit Organization
 - Keep all charts, etc organized for easy access
 - VFR-on-top
 - You are still on an IFR flight plan
 - Use +/- 500 feet altitudes (VFR altitudes)

- Can fly above, below, or between cloud layers
- 35% of all VFR-into-IMC incidents are from instrument-rated pilots
 - These are usually **fatal**
- <u>Ice</u>
 - How did you get there?
 - Where is there no ice? (Behind you, above, below?)
 - A change of altitude by +/- 3000 feet will usually get you out of it
 - However, climbing may not be an option
 - And terrain/obstructions may prevent you from descending
 - Let ATC know!
 - Get a vector off course
 - This may allow for a descent, if it was denied due to traffic
- <u>Clearances</u>
 - "Immediately" = Act now
 - "At pilot's discretion"
 - "Expedite"
 - If you accept, this is a clearance that you are bound to
 - "When able"
- <u>Holding</u>
 - First thing to do: slow down
 - Slowing down might allow you to avoid the hold, or reduce the length of it
 - Ask for extended legs
 - Monitor <u>fuel</u>
 - Holds aren't flight-planned for
 - Most airlines have to discuss fuel every 15 minutes in a hold
- <u>Approach</u>

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- Anticipate the approach you are likely to get
 - Check the ATIS/AWOS
 - Listen to what other pilots are getting
 - Or, simply ask ATC
 - Key items to brief
 - Course
 - Intercept altitude
 - DA/MDA
 - 1st missed approach step

- "Cleared for approach"
 - Descend to approach altitude ONLY if on a published approach course
- "Airport is X miles, advise when in sight"
 - Controller is trying to end their responsibility for your terrain/obstruction/aircraft avoidance
- Contact approach
 - Not a good idea if unfamiliar with the airport/area
- <u>Tips</u>
 - ° Rehearse
 - Pre-fly the route
 - Mentally
 - Flight sim
 - Slow things down
 - Close the flight plan

Using Professional Pilot & Instructor Techniques in Your VFR & IFR Flying Jeffrey Robert Moss

1. Communications

- Carefully word you requests
 - Asking for flight following from <u>Center</u>
 - "<Center name>, N12345, can I receive a beacon code?"
 - After receiving code, provide aircraft type, altitude, and destination
 - Asking for flight following from <u>TRACON</u>
 - "<Approach name>, N12345, request"
 - After contact: "N12345 would like flight following to <destination> with a center hand-off"
 - Key is to wording your requests into the controller's workflow
 - If you talk like a pro, you'll get treated like a pro
- 2. <u>Mastering Automation</u>
 - PHD Push Here Dummy
 - This doesn't explain the "why"
 - When changing an autopilot mode, <u>call out</u> the mode change
 - Mode management process
 - Check current mode
 - Select new mode
 - Confirm the new mode (call it out)
 - Verify the aircraft is doing what it should
 - Before engaging the autopilot, verify the course is selected properly ("map check")
 - The most common reason the autopilot doesn't follow the command is because the autopilot isn't on/engaged!
 - If you still can't figure it out, use heading mode
 - And if all else fails, just hand fly

3. SRM Call-outs

- "Landing checklist complete"
 - "Cleared to land"
 - Or: "No landing clearance issued"
 - This raises your threat level, reminding you to receive clearance before landing
- Approach call-outs
 - (examples are referenced from the DA/MDA)

- These are all called "gates" in airliner speak
- "1000 above, stable, no flags, <repeat DA/MDA>"
- "500 above, stable, cleared to land, <restate missed approach steps>"
 - Reset PCL, perform GUMPS check
- "200 above" (skip if autopilot limitations don't apply)
- "100 above" Make sure your hand is on the throttle
- "50 above, DECIDE"
 - Decide if you will be landing, or going around

4. Procedures

- If approach control provides a new approach after clearing you for a different one
 - *Don't accept* if you need more time
 - "Unable to accept, I need delay vectors to set up for the new approach"
 - Don't specify a time limit
- If you are not ready for the approach, cancel the clearance and ask for a delaying vector
- As PIC, you control the pace of the flight!
- Use the GPS extended centerline to help find the airport
 - XTK shows the distance to the extended centerline
 - G430/530: you can unselect OBS after setting the extended centerline
 - CAUTION: The line will be drawn from the <u>airport reference point</u>
 - For airports with multiple runways, load an IAP and draw a line from the MAP
- If the airport is not in sight by 3 miles, <u>confess and don't descend</u>
- 3 stages of low fuel
 - 1. Threaten to declare minimum fuel if it looks like you will be delayed
 - 2. Declare minimum fuel if you are delayed
 - 3. Declare a fuel emergency

5. <u>Emergencies</u>

- "Plane, Path, People"
 - Use this instead of "Aviate, Navigate, Communicate"
 - This makes you think "Where am I, where am I going, how do I get there"
- ^o T-DODAR (British Airways mnemonic)
 - 1. T = Time (How much time do I have)
 - 2. Diagnose, Options, Decisions, Assignment of tasks
 - Task assignment includes making use of ATC
 - 3. Review (Plane, Path, People)
- <u>www.flylikethepros.com</u>